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Introduction

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

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The *NASA Patent Abstracts Bibliography* is a semiannual NASA publication containing comprehensive abstracts of NASA owned inventions covered by U.S. patents and applications for patent. The citations included in the bibliography arrangement of citations were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

The citations published in this issue cover the period January 1999 through June 1999. This issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in ascending order.

A typical citation and abstract presents the various data elements included in most records cited. This appears after the table of contents.

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Table of Contents

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01 Aeronautics (General) N.A.

For related information, see also *Astronautics*.

02 Aerodynamics N.A.

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information, see also *34 Fluid Mechanics and Heat Transfer*.

03 Air Transportation and Safety N.A.

Includes passenger and cargo air transport operations; and aircraft accidents. For related information, see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 Aircraft Communications and Navigation 1

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information, see also *17 Space Communications, Spacecraft Communications, Command and Tracking* and *32 Communications Radar*.

05 Aircraft Design, Testing and Performance 2

Includes aircraft simulation technology. For related information, see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*. For land transportation vehicles, see *85 Urban Technology and Transportation*.

06 Aircraft Instrumentation N.A.

Includes cockpit and cabin display devices; and flight instruments. For related information, see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 Aircraft Propulsion and Power N.A.

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information, see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 Aircraft Stability and Control N.A.

Includes aircraft handling qualities; piloting; flight controls; and autopilots. For related information, see also *05 Aircraft Design, Testing and Performance*.

09 Research and Support Facilities (Air) N.A.

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information, see also *14 Ground Support Systems and Facilities (Space)*.

12 Astronautics (General) N.A.

For extraterrestrial exploration, see *91 Lunar and Planetary Exploration.*

13 Astrodynamics N.A.

Includes powered and free-flight trajectories; and orbital and launching dynamics.

14 Ground Support Systems and Facilities (Space) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. *For related information, see also 09 Research and Support Facilities (Air).*

15 Launch Vehicles and Space Vehicles N.A.

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information, see also *20 Spacecraft Propulsion and Power.*

16 Space Transportation N.A.

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. For related information, see also *03 Air Transportation and Safety* and *18 Spacecraft Design, Testing and Performance.* For space suits, see *54 Man/System Technology and Life Support.*

17 Space Communications, Spacecraft Communications, Command and Tracking N.A.

Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. For related information, see also *04 Aircraft Communications and Navigation* and *32 Communications and Radar.*

18 Spacecraft Design, Testing and Performance 3

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems, see *54 Man/System Technology and Life Support.* For related information, see also *05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.*

19 Spacecraft Instrumentation N.A.

For related information, see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 Spacecraft Propulsion and Power N.A.

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information, see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion,* and *15 Launch Vehicles and Space Vehicles.*

23 Chemistry and Materials (General) 5

24 Composite Materials 6

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see *27 Nonmetallic Materials*.

25 Inorganic and Physical Chemistry N.A.

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also *77 Thermodynamics and Statistical Physics*.

26 Metallic Materials 9

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 Nonmetallic Materials 11

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see *24 Composite Materials*.

28 Propellants and Fuels 16

Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power*, and *44 Energy Production and Conversion*.

29 Materials Processing N.A.

Includes space-based development of products and processes for commercial application. For biological materials see *55 Space Biology*.

31 Engineering (General) 17

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

32 Communications and Radar N.A.

Includes radar; land and global communications; communications theory; and optical communications. For related information see also *04 Aircraft Communications and Navigation* and *17 Space Communications, Spacecraft Communications, Command and Tracking*. For search and rescue see 03 Air Transportation and Safety, and *16 Space Transportation*.

33 Electronics and Electrical Engineering 19

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

34 Fluid Mechanics and Heat Transfer 21

Includes boundary layers; hydrodynamics; fluidics; mass transfer and ablation cooling. For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

35 Instrumentation and Photography 22

Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see *43 Earth Resources and Remote Sensing*. For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation*.

36 Lasers and Masers 30

Includes parametric amplifiers. For related information see also *76 Solid-State Physics*.

37 Mechanical Engineering 31

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

38 Quality Assurance and Reliability 36

Includes product sampling procedures and techniques; and quality control.

39 Structural Mechanics 37

Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

42 Geosciences (General) N.A.

43 Earth Resources and Remote Sensing N.A.

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see *35 Instrumentation and Photography*.

44 Energy Production and Conversion 38

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also *07 Aircraft Propulsion and Power*, *20 Spacecraft Propulsion and Power*, and *28 Propellants and Fuels*.

45 Environment Pollution N.A.

Includes atmospheric, noise, thermal, and water pollution.

46 Geophysics N.A.

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism. For space radiation see *93 Space Radiation*.

47 Meteorology and Climatology N.A.

Includes weather forecasting and modification.

48 Oceanography N.A.

Includes biological, dynamic, and physical oceanography; and marine resources. For related information see also *43 Earth Resources and Remote Sensing*.

51 Life Sciences (General) 39

52 Aerospace Medicine 41

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

53 Behavioral Sciences N.A.

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 Man/System Technology and Life Support N.A

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also *16 Space Transportation*.

55 Space Biology N.A.

Includes exobiology; planetary biology; and extraterrestrial life.

59 Mathematical and Computer Sciences (General) N.A.

60 Computer Operations and Hardware 44

Includes hardware for computer graphics, firmware, and data processing. For components see *33 Electronics and Electrical Engineering*.

61 Computer Programming and Software N.A.

Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

62 Computer Systems 45

Includes computer networks and special application computer systems.

63 Cybernetics 47

Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also *54 Man/System Technology and Life Support*.

64 Numerical Analysis N.A.

Includes iteration, difference equations, and numerical approximation.

65 Statistics and Probability N.A.

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 Systems Analysis N.A.

Includes mathematical modeling; network analysis; and operations research.

67 Theoretical Mathematics N.A.

Includes topology and number theory.

70 Physics (General) N.A.

For precision time and time interval (PTTI) see *35 Instrumentation and Photography;* for geophysics, astrophysics or solar physics see *46 Geophysics*, *90 Astrophysics*, or *92 Solar Physics*.

71 Acoustics N.A

Includes sound generation, transmission, and attenuation. For noise pollution see *45 Environment Pollution*.

72 Atomic and Molecular Physics 49

Includes atomic structure, electron properties, and molecular spectra.

73 Nuclear and High-Energy Physics N.A.

Includes elementary and nuclear particles; and reactor theory. For space radiation see *93 Space Radiation*.

74 Optics 49

Includes light phenomena and optical devices. For lasers see *36 Lasers and Masers*.

75 Plasma Physics N.A.

Includes magnetohydrodynamics and plasma fusion. For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

76 Solid-State Physics N.A.

Includes superconductivity. For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 Thermodynamics and Statistical Physics N.A.

Includes quantum mechanics; theoretical physics; and Bose and Fermi statistics. For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

80 Social Sciences (General) N.A.

Includes educational matters.

81 Administration and Management N.A.

Includes management planning and research.

82 Documentation and Information Science N.A.

Includes information management; information storage and retrieval technology; technical writing; graphic arts; and micrography. For computer documentation see *61 Computer Programming and Software*.

83 Economics and Cost Analysis N.A.

Includes cost effectiveness studies.

84 Law, Political Science and Space Policy N.A.

Includes NASA appropriation hearings; aviation law; space law and policy; international law; international cooperation; and patent policy.

85 Urban Technology and Transportation N.A.

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation. For related information see *03 Air Transportation and Safety*, *16 Space Transportation*, and *44 Energy Production and Conversion*.

88 Space Sciences (General) N.A.

89 Astronomy N.A.

Includes radio, gamma-ray, and infrared astronomy; and astrometry.

90 Astrophysics N.A.

Includes cosmology; celestial mechanics; space plasmas; and interstellar and interplanetary gases and dust. For related information see also *75 Plasma Physics*.

91 Lunar and Planetary Exploration N.A.

Includes planetology; and manned and unmanned flights. For spacecraft design or space stations see *18 Spacecraft Design, Testing and Performance*.

92 Solar Physics N.A.

Includes solar activity, solar flares, solar radiation and sunspots. For related information see also *93 Space Radiation*.

93 Space Radiation N.A.

Includes cosmic radiation; and inner and outer earth's radiation belts. For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

99 General N.A.

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

Indexes

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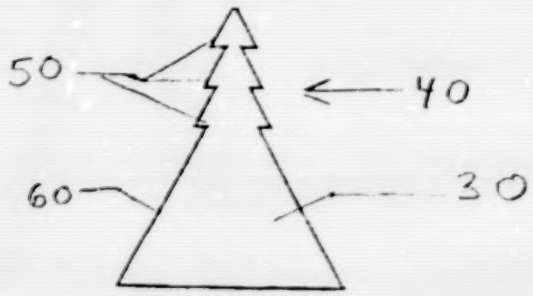
Typical Report Citation and Abstract

❶ 19970011223 NASA Langley Research Center, Hampton, VA USA
❷ Serrated-Planform Lifting-Surfaces
❸ McGrath, Brian E., Inventor, NASA Langley Research Center, USA; Wood, Richard M., Inventor, NASA Langley Research
❹ Center, USA; Oct. 22, 1996; 38p; In English
❺ Patent Info.: Filed 22 Oct. 1996, NASA-Case-LAR-15295-1; US-Patent-Appl-SN-734820
❻ Report No.(s): NAS 1.71:LAR-15295-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche
❼ A set of serrated-planform lifting surfaces is provided which produces unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides an means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.
❽ NASA
❾ *Angle of Attack; Lift; Vortex Sheddicy; Active Control; Lifting Bodies*

❿



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A Continuing Bibliography (Suppl. 55)

JULY 1999

04
AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also 17 Space Communications, Spacecraft Communications, Command and Tracking and 32 Communications and Radar.

19990088576 NASA Pasadena Office, CA USA

Robust Real-Time Wide-Area Differential GPS Navigation

Yunck, Thomas P., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Bertiger, William I., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Lichten, Stephen M., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Mannucci, Anthony J., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Muellerschoen, Ronald J., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Wu, Sien-Chong, Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Oct. 27, 1998; 9p; In English

Patent Info.: Filed 29 Mar. 1996; NASA-Case-NPO-19625-1-CU; US-Patent-5,828,336; US-Patent-Appl-SN-628566; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention provides a method and a device for providing superior differential GPS positioning data. The system includes a group of GPS receiving ground stations covering a wide area of the Earth's surface. Unlike other differential GPS systems wherein the known position of each ground station is used to geometrically compute an ephemeris for each GPS satellite, the present system utilizes real-time computation of satellite orbits based on GPS data received from fixed ground stations through a Kalman-type filter/smoother whose output adjusts a real-time orbital model. ne orbital model produces and outputs orbital corrections allowing satellite ephemerides to be known with considerable greater accuracy than from die GPS system broadcasts. The modeled orbits are propagated ahead in time and differenced with actual pseudorange data to compute clock offsets at rapid intervals to compensate for SA clock dither. The orbital and dock calculations are based on dual frequency GPS data which allow computation of estimated signal delay at each ionospheric point. These delay data are used in real-time to construct and update an ionospheric shell map of total electron content which is output as part of the orbital correction data, thereby allowing single frequency users to estimate ionospheric delay with an accuracy approaching that of dual frequency users.

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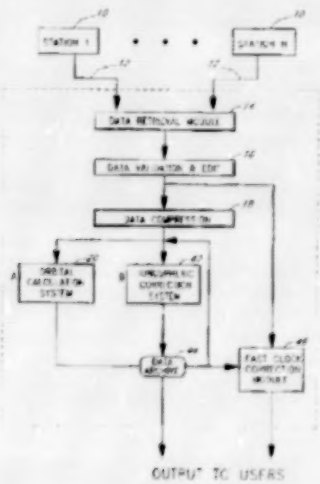
Global Positioning System; Kalman Filters; Satellite Orbits; Real Time Operation; Navigation Satellites



05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology. For related information see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles see 85 Urban Technology and Transportation.

19990008588 NASA Ames Research Center, Moffett Field, CA USA

Tip Fence for Reduction of Lift-Generated Airframe Noise

Ross, James C., Inventor, NASA Ames Research Center, USA; Storms, Bruce L., Inventor, NASA Ames Research Center, USA; Apr. 14, 1998; 10p; In English

Patent Info.: Filed 8 Jun. 1995; NASA-Case-ARC-14009-1-LE; US-Patent-5,738,298; US-Patent-Appl-SN-482459; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention is directed toward a unique lift-generated noise reduction apparatus. This apparatus includes a plurality of tip fences that are secured to the trailing and leading assemblies of the high-lift system, as close as possible to the discontinuities where the vortices are most likely to form. In one embodiment, these tip fences are secured to some or all of the outboard and inboard tips of the wing slats and flaps. The tip fence includes a generally flat, or an aerodynamically shaped plate or device that could be formed of almost any rigid material, such as metal, wood, plastic, fiber glass, aluminum, etc. In a preferred embodiment, the tip fences extend below and perpendicularly to flaps and the slats to which they are attached, such that these tip fences are aligned with the nominal free stream velocity of the aircraft. In addition to reducing airframe noise, the tip fence tends to decrease drag and to increase lift, thus improving the overall aerodynamic performance of the aircraft. Another advantage presented by the tip fence lies in the simplicity of its design, its elegance, and its ready ability to fit on the wing components, such as the flaps and the slats. Furthermore, it does not require non-standard materials or fabrication techniques, and it can be readily, easily and inexpensively retrofited on most of the existing aircraft, with minimal design changes.

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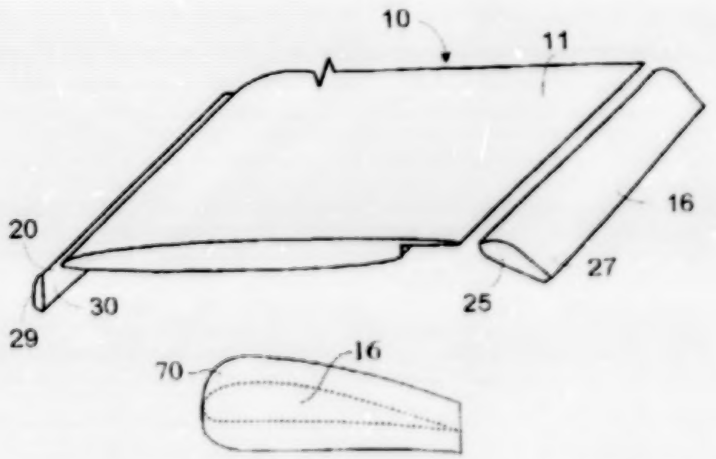
Aircraft Structures; Aerodynamic Noise; Aerodynamic Configurations; Aircraft Noise; Noise Reduction; Aircraft Design



19990046080 NASA Ames Research Center, Moffett Field, CA USA

System and Method for Finite Element Simulation of Helicopter Turbulence

McFarland, R. E., Inventor, NASA Ames Research Center, USA; Dulsenberg, Ken, Inventor, NASA Ames Research Center, USA; Jan. 19, 1999; 18p; In English

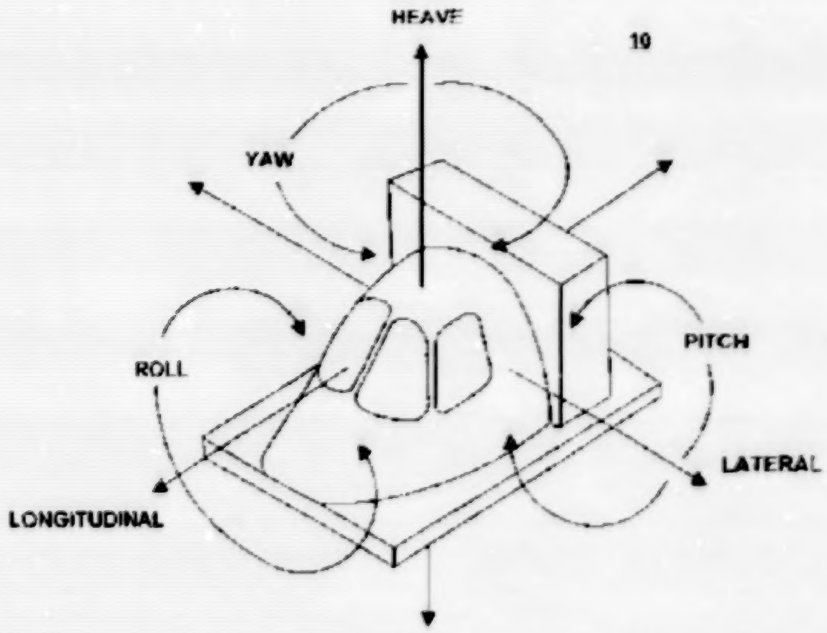
Patent Info.: Filed 22 Apr. 1996; NASA-Case-ARC-14053-1-LE; US-Patent-5,860,807; US-Patent-Appl-SN-656145; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention provides a turbulence model that has been developed for blade-element helicopter simulation. This model uses an innovative temporal and geometrical distribution algorithm that preserves the statistical characteristics of the turbulence spectra over the rotor disc, while providing velocity components in real time to each of five blade element stations along each of four blades, for a total of twenty blade-element stations. The simulator system includes a software implementation of flight dynamics that adheres to the guidelines for turbulence set forth in military specifications. One of the features of the present simula-

tor system is that it applies simulated turbulence to the rotor blades of the helicopter, rather than to its center of gravity. The simulator system accurately models the rotor penetration into a gust field. It includes time correlation between the front and rear of the main rotor, as well as between the side forces felt at the center of gravity and at the tail rotor. It also includes features for added realism, such as patchy turbulence and vertical gusts in to which the rotor disc penetrates. These features are realized by a unique real time implementation of the turbulence filters. The new simulator system uses two arrays one on either side of the main rotor to record the turbulence field and to produce time-correlation from the front to the rear of the rotor disc. The use of Gaussian Interpolation between the two arrays maintains the statistical properties of the turbulence across the rotor disc. The present simulator system and method may be used in future and existing real-time helicopter simulations with minimal increase in computational workload.

Official Gazette of the U.S. Patent and Trademark Office

Helicopters; Turbulence; Real Time Operation; Computerized Simulation; Finite Element Method



18
SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

19990008547 NASA Ames Research Center, Moffett Field, CA USA

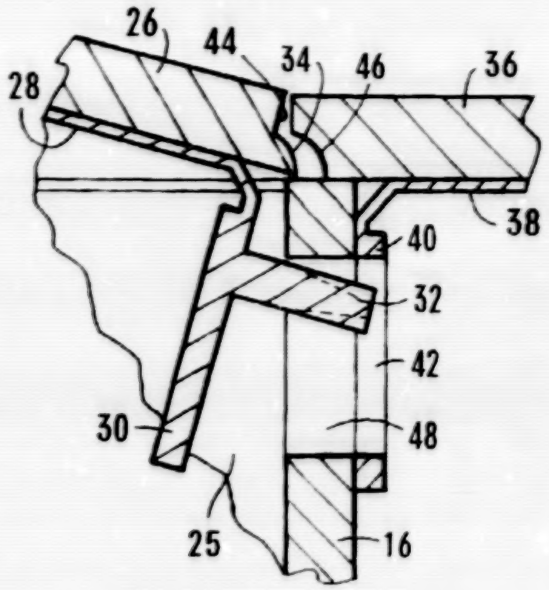
Integrated Thermal Insulation System for Spacecraft

Kolodziej, Paul, Inventor, NASA Ames Research Center, USA; Bull, Jeff, Inventor, NASA Ames Research Center, USA; Kowalski, Thomas, Inventor, NASA Ames Research Center, USA; Switzer, Matthew, Inventor, NASA Ames Research Center, USA; Sep. 08, 1998; 8p; In English

Patent Info.: Filed 22 Apr. 1996; NASA-Case-ARC-14052-1SB; US-Patent-5,803,406; US Patent-Appl-656144; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

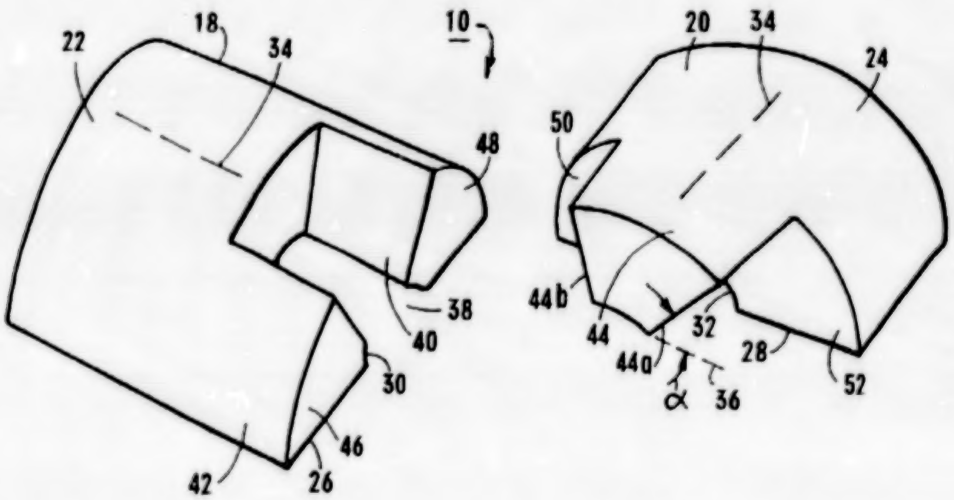
An integrated thermal protection system (TPS) for a spacecraft includes a grid that is bonded to skin of the spacecraft, e.g., to support the structural loads of the spacecraft. A plurality of thermally insulative, relatively large panels are positioned on the grid to cover the skin of the spacecraft to which the grid has been bonded. Each panel includes a rounded front edge and a front flange depending downwardly from the front edge. Also, each panel includes a rear edge formed with a rounded socket for receiving the rounded front edge of another panel therein, and a respective rear flange depends downwardly from each rear edge. Pins are formed on the front flanges, and pin receptacles are formed on the rear flanges, such that the pins of a panel mechanically

interlock with the receptacles of the immediately forward panel. to reduce the transfer to the skin of heat which happens to leak through the panels to the grid, the grid includes stringers that are chair-shaped in cross-section.
Official Gazette of the U.S. Patent and Trademark Office
Spacecraft Shielding; Curved Panels; Thermal Insulation



19990008595 NASA Ames Research Center, Moffett Field, CA USA
Leading Edge Heat Shield for Wings of Spacecraft
Stewart, David A., Inventor, NASA Ames Research Center, USA; Jun. 30, 1998; 5p; In English
Patent Info.: Filed 28 Nov. 1995; NASA-Case-ARC-14031-1GE; US-Patent-5,772,154; US-Patent-Appl-SN-563418; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A heat shield for thermally insulating the leading edge of a wing of a spacecraft during ascent and reentry includes a plurality of rigid tiles. Each tile is formed with a pie-shaped element which interlocks with the complementarily-formed element of another tile. The combination of structure afforded by the pie-shaped elements substantially impedes hypersonic flow of any gases that might enter the gaps between tiles.
Official Gazette of the U.S. Patent and Trademark Office
Heat Shielding; Wings; Spacecraft Design; Thermal Insulation



19990068586 NASA Johnson Space Center, Houston, TX USA

Distributed Pore Chemistry in Porous Organic Polymers

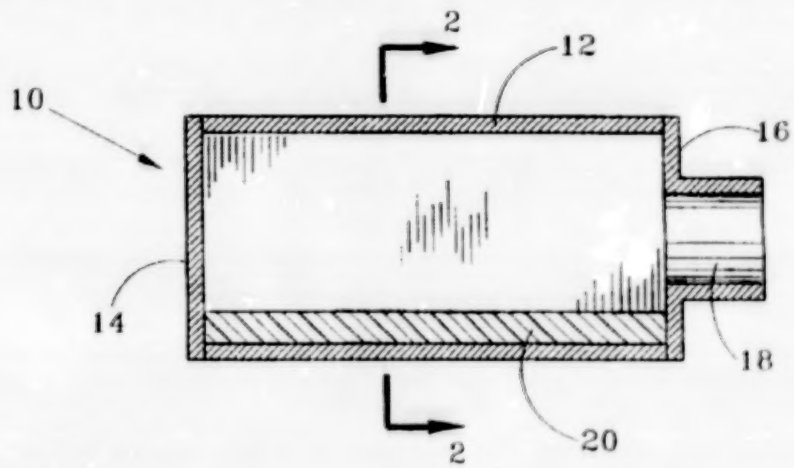
Koontz, Steven L., Inventor, NASA Johnson Space Center, USA; Aug. 25, 1998; 16p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-857901, filed 26 Mar. 1992, US-Patent-5,369,012, and a continuation-in-part of abandoned US-Patent-Appl-SN-997265, filed 23 Feb. 1993, US-Patent-5,332,551

Patent Info.: Filed 3 Jun. 1994; NASA-Case-MSC-22419-1; US-Patent-5,798,261; US-Patent-Appl-SN-254361; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method for making a biocompatible polymer article using a uniform atomic oxygen treatment is disclosed. The sub-strate may be subsequently optionally grated with a compatibilizing compound. Compatibilizing compounds may include proteins, phosphorylcholine groups, platelet adhesion preventing polymers, albumin adhesion promoters, and the like. The compatibilized substrate may also have a living cell layer adhered thereto. The atomic oxygen is preferably produced by a flowing afterglow microwave discharge, wherein the substrate resides in a sidearm out of the plasma. Also, methods for culturing cells for various purposes using the various membranes are disclosed as well. Also disclosed are porous organic polymers having a distributed pore chemistry (DPC) comprising hydrophilic and hydrophobic region, and a method for making the DPC by exposing the polymer to atomic oxygen wherein the rate of hydrophilization is greater than the rate of mass loss.

Official Gazette of the U.S. Patent and Trademark Office

Porosity; Procedures; Proteins; Adhesion; Afterglows



19990046081 NASA Lewis Research Center, Cleveland, OH USA

Substituted 1,1,1-Triaryl-2,2,2-Trifluoroethanes and Processes for their Synthesis

Alston, William B., Inventor, NASA Lewis Research Center, USA; Gratz, Roy F., Inventor, NASA Lewis Research Center, USA; Jan. 19, 1999; 14p; In English; Division of US-Patent-Appl-SN-982350, filed 27 Nov. 1992

Patent Info.: Filed 15 Arp. 1994; NASA-Case-LEW-14345-8; US-Patent-5,861,540; US-Patent-Appl-SN-228541; US-Patent-Appl-SN-982350; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Synthetic procedures to tetraalkyls. tetraacids and dianhydrides substituted 1,1,1-triaryl-2,2,2-trifluoroethanes which comprises: (1) 1,1-bis(dialkylaryl)-1-aryl-2,2,2 -trifluoroethane, (2) 1,1-bis(dicarboxyaryl)-1-aryl-2,2,2- trifluoroethane or (3) cyclic dianhydride or diamine of 1,1-bis(dialkylaryl)-1-aryl-2,2,2- trifluoroethanes. The synthesis of (1) is accomplished by the condensation reaction of an aryltrifluoromethyl ketone with a dialkylaryl compound. The synthesis of (2) is accomplished by oxidation of (1). The synthesis dianhydride of (3) is accomplished by the conversion of (2) to its corresponding cyclic dianhydride. The

synthesis of the diamine is accomplished by the similar reaction of an aryltrifluoromethyl ketone with aniline or alkyl substituted or disubstituted anilines. Also, other derivatives of the above are formed by nucleophilic displacement reactions.
Official Gazette of the U.S. Patent and Trademark Office
Alkyl Compounds; Diamines; Anhydrides; Aniline; Hydrocarbons; Nuclear Reactions

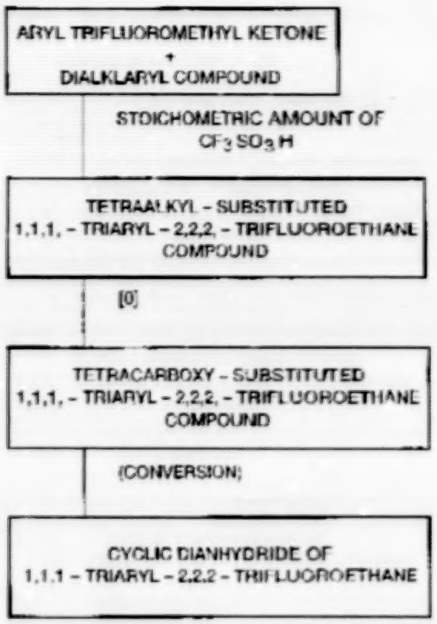


FIG. 1

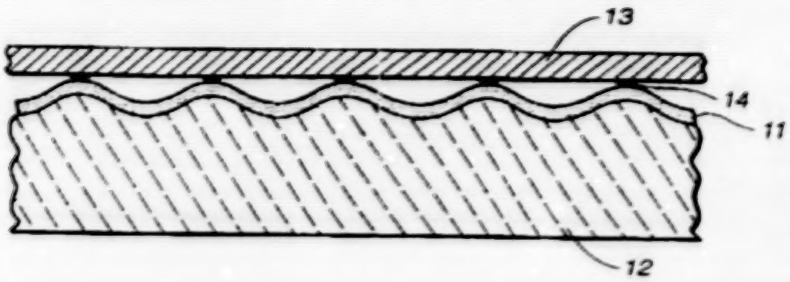
24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

19990008596 NASA Ames Research Center, Moffett Field, CA USA
Flexible Ceramic-Metal Insulation Composite and Method of Making
Rasky, Daniel J., Inventor, NASA Ames Research Center, USA; Sawko, Paul M., Inventor, NASA Ames Research Center, USA; Kilodziej, Paul, Inventor, NASA Ames Research Center, USA; Kourtides, Demetrius A., Inventor, NASA Ames Research Center, USA; Apr. 28, 1998; 7p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-700368, filed 6 May 1991
Patent Info.: Filed 11 Jan. 1993; NASA-Case-ARC-11989-1GE; US-Patent-5,744,252; US-Patent-Appl-SN-075367; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method for joining a woven flexible ceramic fabric and a thin metal sheet creating an integral metal surfaced flexible thermal protection article, which methods compress: placing multiple dots of high temperature metallic or fabric and the thin metal sheet in a random or organized pattern, with the proviso that the brazing material covers about 10% or less of the surface of one flat side of the metal sheet; heating the flexible ceramic fabric, brazing material and thin metal sheet for a predetermined period of time to integrally connect the same; and cooling the formed flexible article to ambient temperature. Preferably the flexible ceramic is selected from fibers comprising atoms of silicon, carbon, nitrogen, boron, oxygen or combinations thereof. The flexible thermal protection article produced is also part of the present invention. The thin metal sheet is comprised of titanium, aluminum, chromium, niobium or alloys or combinations thereof. The brazing material is selected from copper/silver or copper/gold or is a ceramic brazing or adhesive material.
Author

Ceramics; Thermal Protection; Ambient Temperature; Chromium Alloys; Aluminum Alloys; Fabrics; Metal Sheets; Niobium Alloys; Materials Science



19990046083 NASA Lewis Research Center, Cleveland, OH USA

Self-Lubricating Composite Containing Chromium Oxide

Dellacorte, Christopher, Inventor, NASA Lewis Research Center, USA; Edmonds, Brian J., Inventor, NASA Lewis Research Center, USA; Feb. 02, 1999; 6p; In English

Patent Info.: Filed 16 Jan. 1997; NASA-Case-LEW-16183-1; US-Patent-5,866,518; US-Patent-Appl-SN-786360; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A self lubricating, friction and wear reducing composite material useful over a wide temperature range of from cryogenic temperature up to about 900 C, contains 60 80 wt. % of particulate Cr2O3, dispersed in a metal binder of a metal alloy containing Cr and at least 50 wt. % of Ni, Cr or a mature of Ni and Cr. It also contains 5-20 wt. % of a fluoride of at least one Group I, Group II or rare earth metal and, optionally, 5-20 wt. % of a low temperature lubricant metal, such as Ag, Au, Pt, Pd, Rh and Cu. This composite exhibits less oxidation instability and less abrasiveness than composites containing chromium carbide, is readily applied using plasma spray and can be ground and polished with a silicon carbide abrasive.

Official Gazette of the U.S. Patent and Trademark Office

Lubrication; Cryogenic Temperature; Chromium Oxides; Silicon Carbides; Plasmas (Physics); Composite Materials

19990046085 NASA Lewis Research Center, Cleveland, OH USA

Producing Fiber Reinforced Composites Having Dense Ceramic Matrices

Behrendt, Donald R., Inventor, NASA Lewis Research Center, USA; Singh, Mrityunjay, Inventor, NASA Lewis Research Center, USA; Feb. 02, 1999; 4p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-265902, filed 21 Jun. 1994

Patent Info.: Filed 20 Sep. 1996; NASA-Case-LEW-15449-2; US-Patent-5,865,922; US-Patent-Appl-SN-725205; US-Patent-Appl-SN-265902; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A fiber preform is partially infiltrated with a ceramic material. A porous solid polymer is formed by reaction forming the infiltrated preform which is then pyrolized. Microporous carbon in the composite matrix is converted into silicon carbide.

Official Gazette of the U.S. Patent and Trademark Office

Ceramic Matrix Composites; Silicon Carbides; Preforms; Fiber Composites; Ceramics

19990046773 NASA Lewis Research Center, Cleveland, OH USA

Elemental Metals or Oxides Distributed on a Carbon Substrate or Self-Supported and the Manufacturing Process Using Graphite Oxide as Template

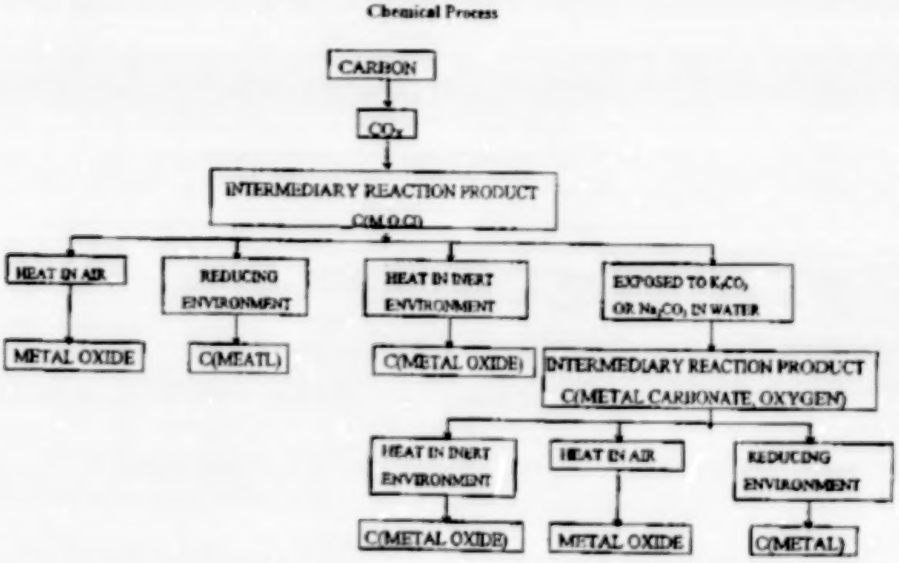
Hung, Ching-Cheh, Inventor, NASA Lewis Research Center, USA; Mar. 02, 1999; In English

Patent Info.: Filed 4 Apr. 1997; NASA-Case-LEW-16342-1; US-Patent-5,876,687; US-Patent-Appl-SN-833107; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A process for providing elemental metals or metal oxides distributed on a carbon substrate or self-supported utilizing graphite oxide as a precursor. The graphite oxide is exposed to one or more metal chlorides to form an intermediary product comprising carbon, metal, chloride, and oxygen. This intermediary product can be further processed by direct exposure to carbonate-solutions to form a second intermediary product comprising carbon, metal carbonate, and oxygen. Either intermediary product may be further processed: a) in air to produce metal oxide; b) in an inert environment to produce metal oxide on carbon substrate; c) in a reducing environment to produce elemental metal distributed on carbon substrate. The product generally takes the shape of the carbon precursor.

Official Gazette of the U.S. Patent and Trademark Office

Graphite; Metal Oxides; Substrates; Carbonates; Metals



19990046777 NASA Langley Research Center, Hampton, VA USA

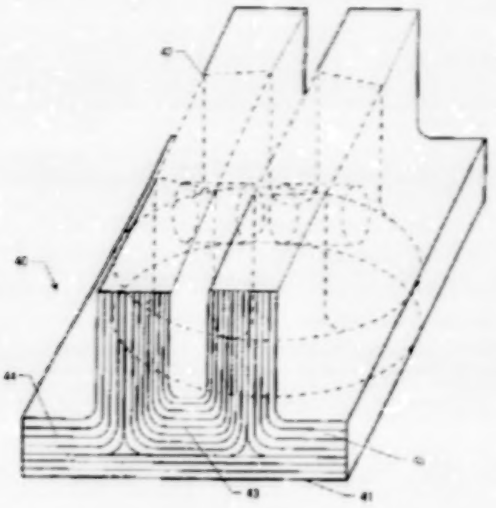
Carbon-Carbon Piston Architectures

Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Schwind, Francis A., Inventor, NASA Langley Research Center, USA; May 04, 1999; In English; Provisional Application of US-Patent-Appl-SN-012930, filed 6 Mar. 1996

Patent Info.: Filed 27 Feb. 1997; NASA-Case-LAR-15492-1; US-Patent-5,900,193; US-Patent-Appl-SN-805195; US-Patent-Appl-SN-012930; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved structure for carbon-carbon composite piston architectures consists of replacing the knitted fiber, three-dimensional piston preform architecture described in U.S. Pat. No. 4,909,133 (Taylor et al.) with a two-dimensional lay-up or molding of carbon fiber fabric or tape. Initially, the carbon fabric or tape layers are prepregged with carbonaceous organic resins and/or pitches and are laid up or molded about a mandrel, to form a carbon-fiber reinforced organic-matrix composite part shaped like a "U" channel, a "T"-bar, or a combination of the two. The molded carbon-fiber reinforced organic-matrix composite part is then pyrolized in an inert atmosphere, to convert the organic matrix materials to carbon. At this point, cylindrical piston blanks are cored from the "U" channel, "T"-bar, or combination part. These blanks are then densified by reimpregnation with resins or pitches which are subsequently carbonized. Densification is also be accomplished by direct infiltration with carbon by vapor deposition processes. Once the desired density has been achieved, the piston billets are machined to final piston dimensions; coated with oxidation sealants; and/or coated with a catalyst. When compared to conventional steel or aluminum-alloy pistons, the use of car-

bon-carbon composite pistons reduces the overall weight of the engine; allows for operation at higher temperatures without a loss of strength; allows for quieter operation; reduces the heat loss; and reduces the level of hydrocarbon emissions.
Official Gazette of the U.S. Patent and Trademark Office
Pistons; Carbon-Carbon Composites; Carbon Fibers; Casting; Aluminum Alloys; Resins

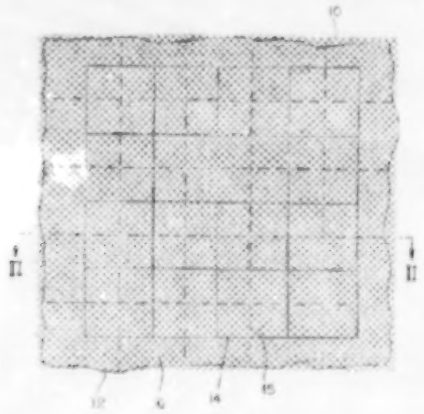


26
METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

19990008548 NASA Ames Research Center, Moffett Field, CA USA
Durable Advanced Flexible Reusable Surface Insulation
Rasky, Daniel, Inventor, NASA Ames Research Center, USA; Kourtides, Demetrius A., Inventor, NASA Ames Research Center, USA; Dittman, Daniel L., Inventor, NASA Ames Research Center, USA; Rezin, Marc D., Inventor, NASA Ames Research Center, USA; Hiel, Clement, Inventor, NASA Ames Research Center, USA; Vallotton, Wilbur C., Inventor, NASA Ames Research Center, USA; Sep. 22, 1998; 16p; In English
Patent Info.: Filed 19 Jan. 1996; NASA-Case-ARC-12081-1CU; US-Patent-5,811,168; US-Patent-Appl-SN-598738; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved flexible blanket includes a nickel-based alloy foil layer brazed to a nickel-based alloy fabric layer. The fabric layer is stitched to an underlying ceramic insulation layer.
Official Gazette of the U.S. Patent and Trademark Office
Insulation; Fabrics; Metal Foils



19990008594 NASA Lewis Research Center, Cleveland, OH USA

Two-Phase (TiAl+TiCrAl) Coating Alloys for Titanium Aluminides

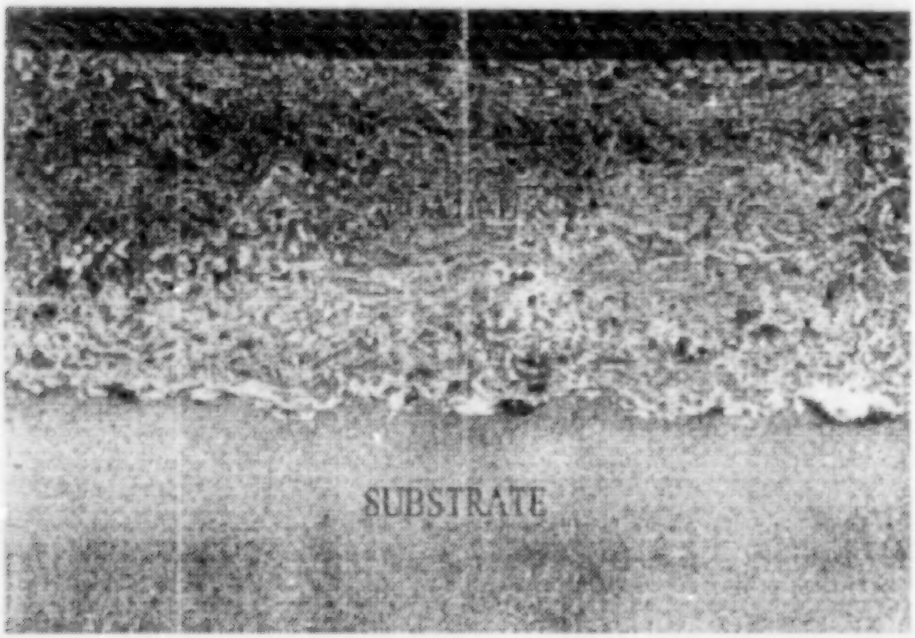
Brady, Michael P., Inventor, NASA Lewis Research Center, USA; Smialek, James L., Inventor, NASA Lewis Research Center, USA; Brindley, William J., Inventor, NASA Lewis Research Center, USA; Nov. 17, 1998; 11p; In English

Patent Info.: Filed 3 Jul. 1996; NASA-Case-LEW-20003-1; US-Patent-5,837,387; US-Patent-Appl-SN-675126; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A coating for protecting titanium aluminide alloys, including the TiAl gamma + Ti3Al (alpha(sub 2)) class, from oxidative attack and interstitial embrittlement at temperatures up to at least 1000 C, is disclosed. This protective coating consists essentially of titanium, aluminum, and chromium in the following approximate atomic ratio: Ti(41.5-34.5)Al(49-53)Cr(9.5-12.5)

Official Gazette of the U.S. Patent and Trademark Office

Aluminum Alloys; Titanium Aluminides; Protective Coatings; Intermetallics



19990046067 NASA Lewis Research Center, Cleveland, OH USA

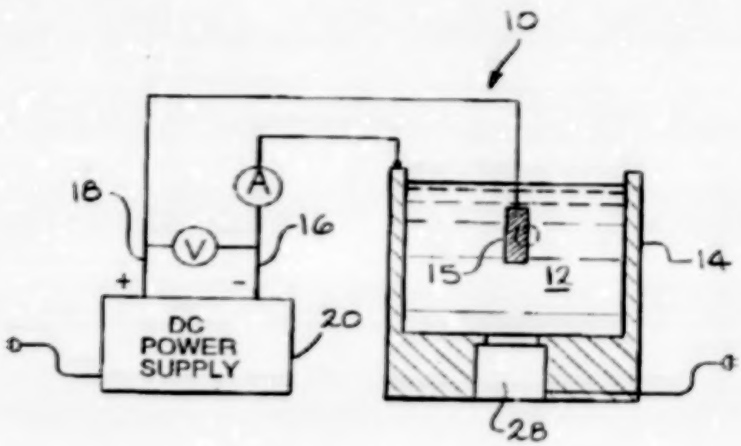
Method for Surface Texturing Titanium Products

Banks, Bruce A., Inventor, NASA Lewis Research Center, USA; Dec. 29, 1998; 12p; In English

Patent Info.: Filed 23 Jun. 1997; NASA-Case-LEW-16392-1; US-Patent-5,853,561; US-Patent-Appl-SN-999562; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention teaches a method of producing a textured surface upon an arbitrarily configured titanium or titanium alloy object for the purpose of improving bonding between the object and other materials such as polymer matrix composites and/or human bone for the direct in-growth of orthopaedic implants. The titanium or titanium alloy object is placed in an electrolytic cell having an ultrasonically agitated solution of sodium chloride therein whereby a pattern of uniform "pock mark" like pores or cavities are produced upon the object's surface. The process is very cost effective compared to other methods of producing rough surfaces on titanium and titanium alloy components. The surface textures produced by the present invention are etched

directly into the parent metal at discrete sites separated by areas unaffected by the etching process. Bonding materials to such surface textures on titanium or titanium alloy can thus support a shear load even if adhesion of the bonding material is poor.
Official Gazette of the U.S. Patent and Trademark Office
Titanium; Sodium Chlorides; Polymer Matrix Composites; Adhesive Bonding; Electrolytic Cells; Titanium Alloys



27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

19990008543 NASA Ames Research Center, Moffett Field, CA USA
Organopolysiloxane Waterproofing Treatment for Porous Ceramics
Leiser, Daniel B., Inventor, NASA Ames Research Center, USA; Cagliostro, Domenick E., Inventor, NASA Ames Research Center, USA; Hsu, Ming-ta S., Inventor, NASA Ames Research Center, USA; Chen, Timothy S., Inventor, NASA Ames Research Center, USA; Jun. 16, 1998; 6p; In English
Patent Info.: Filed 30 Oct. 1996; NASA-Case-ARC-14068-1-SB; US-Patent-5,766,322; US-Patent-Appl-SN-745405; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Rigid and flexible porous ceramics, including thermal insulation of a type used on space vehicles, are waterproofed by a treatment which comprises applying an aqueous solution of an organopolysiloxane water-proofing agent having reactive silanol groups to the surface of the ceramic and then heating the treated ceramic to form a waterproofed ceramic. The organopolysiloxane is formed by the hydrolysis and partial condensation of di- and trialkoxyfunctional alkylalkoxysilanes having 1-10 carbon atom hydrocarbyl groups.
Official Gazette of the U.S. Patent and Trademark Office
Ceramics; Organic Silicon Compounds; Porous Materials; Waterproofing; Protective Coatings

19990008546 NASA Ames Research Center, Moffett Field, CA USA
Method for Waterproofing Ceramic Materials
Cagliostro, Domenick E., Inventor, NASA Ames Research Center, USA; Hsu, Ming-Ta S., Inventor, NASA Ames Research Center, USA; Sep. 29, 1998; 8p; In English
Patent Info.: Filed 13 Sep. 1995; NASA-Case-ARC-14029-1-SB; US-Patent-5,814,397; US-Patent-Appl-SN-537585; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Hygroscopic ceramic materials which are difficult to waterproof with a silane, substituted silane or silazane waterproofing agent, such as an alumina containing fibrous, flexible and porous, fibrous ceramic insulation used on a reentry space vehicle, are rendered easy to waterproof if the interior porous surface of the ceramic is first coated with a thin coating of silica. The silica coating is achieved by coating the interior surface of the ceramic with a silica precursor converting the precursor to silica either in-situ or by oxidative pyrolysis and then applying the waterproofing agent to the silica coated ceramic. The silica precursor comprises almost any suitable silicon containing material such as a silane, silicone, siloxane, silazane and the like applied by solution, vapor deposition and the like. If the waterproofing is removed by e.g., burning, the silica remains and the ceramic is easily rewaterproofed. An alumina con-

taining TABI insulation which absorbs more that five times it's weight of water, absorbs less than 10 wt. % water after being waterproofed according to the method of the invention.

Official Gazette of the U.S. Patent and Trademark Office

Technology Assessment; Ceramics; Coatings; Insulation; Pyrolysis; Silanes; Silicon; Waterproofing

19990008575 NASA Johnson Space Center, Houston, TX USA

Microcapsules and Methods for Making

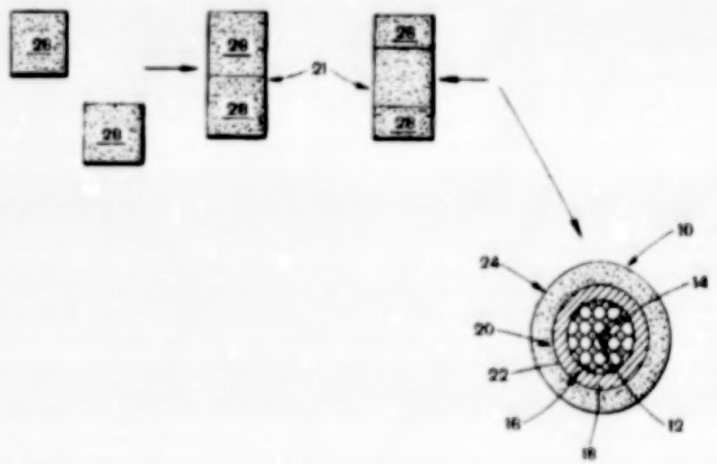
Morrison, Dennis R., Inventor, NASA Johnson Space Center, USA; Mosier, Benjamin, Inventor, NASA Johnson Space Center, USA; Oct. 27, 1998; 26p; In English

Patent Info.: Filed 2 Dec. 1994; NASA-Case-MSC-22489-1; US-Patent-5,827,531; US-Patent-Appl-SN-349169; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Methods of forming multi-lamellar microcapsules having alternating layers of hydrophilic and hydrophobic immiscible liquid phases have been developed using different polymer/solvent systems. The methods use liquid-liquid diffusion and simultaneous lateral phase separation, controlled by proper timed-sequence exposures of immiscible phases and low shear mixing, to form narrow size distributions of spherical, multilamellar microcapsules. The use of special formulations of solubilized drugs, surfactants, and polymeric co-surfactants in aqueous vehicles which are dispersed in hydrocarbon solvents containing small quantities of oil, low molecular weight co-surfactants and glycerides that are aqueous insoluble enables the formation of unique microcapsules which can carry large amounts of pharmaceuticals in both aqueous and non-aqueous solvent compartments. The liquid microcapsules are quickly formed in a single step and can include a polymeric outer 'skin' which protects the microcapsules during physical manipulation or exposure to high shear forces. Water-in-oil and oil-in-water microcapsules have been formed both in 1 x g and in microgravity, which contain several types of drugs co-encapsulated within different fluid compartments inside the same microcapsule. Large, spherical multi-lamellar microcapsules have been formed including a cytotoxic drug co-encapsulated with a radiocontrast medium which has advantages for chemoembolization of vascular tumors. In certain cases, crystals of the drug form inside the microcapsules providing zero-order and first order, sustained drug release kinetics.

Official Gazette of the U.S. Patent and Trademark Office

Toxins and Antitoxins; Hydrocarbons; Glycerides; Microgravity; Kinetics; Liquid Phases



19990008579 NASA Langley Research Center, Hampton, VA USA

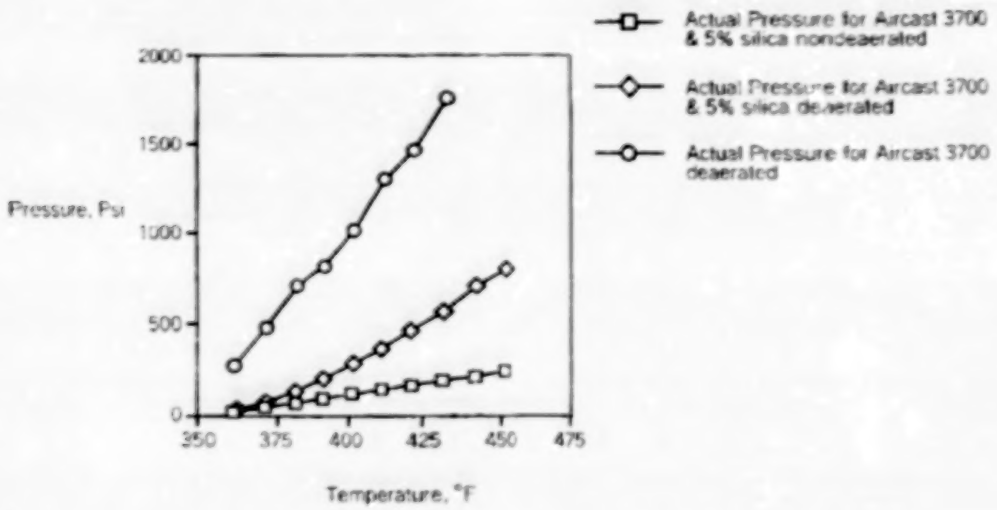
Method for Molding Structural Parts Utilizing Modified Silicone Rubber

Weiser, Erik S., Inventor, NASA Langley Research Center, USA; Baucom, Robert M., Inventor, NASA Langley Research Center, USA; Snoha, John J., Inventor, NASA Langley Research Center, USA; Sep. 29, 1998; 6p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-292621, filed 12 Aug. 1994

Patent Info.: Filed 25 Mar. 1997; NASA-Case-LAR-15217-2; US-Patent-5,814,259; US-Patent-Appl-SN-824097; US-Patent-Appl-SN-292621; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

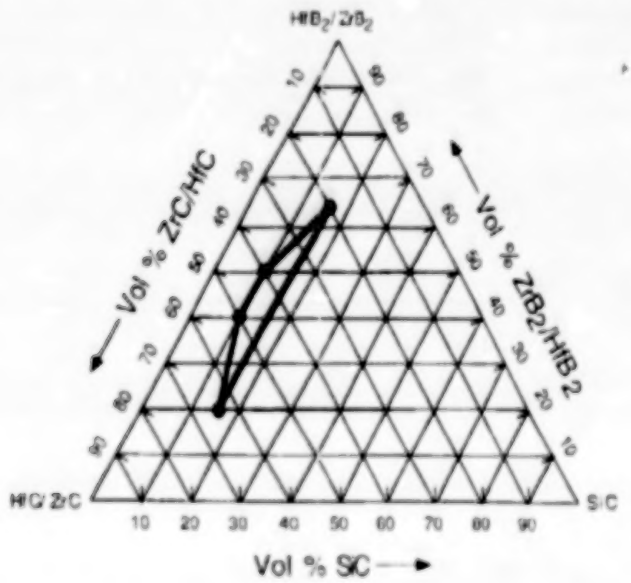
This invention improves upon a method for molding structural parts from preform material. Preform material to be used for the part is provided. A silicone rubber composition containing entrained air voids is prepared. The silicone rubber and preform material assembly is situated within a rigid mold cavity used to shape the preform material to die desired shape. The entire assembly is heated in a standard heating device so that the thermal expansion of the silicone rubber exerts the pressure necessary to force

the preform material into contact with the mold container. The introduction of discrete air voids into the silicone rubber allows for accurately controlled pressure application on the preform material at the cure temperature.
Official Gazette of the U.S. Patent and Trademark Office
Procedures; Molding Materials; Structural Members; Silicone Rubber



19990088683 NASA Ames Research Center, Moffett Field, CA USA
Ablation Resistant Zirconium and Hafnium Ceramics
Bull, Jeffrey, Inventor, NASA Ames Research Center, USA; White, Michael J., Inventor, NASA Ames Research Center, USA; Kaufman, Larry, Inventor, NASA Ames Research Center, USA; May 12, 1998; 8p; In English
Patent Info.: Filed 30 Sep. 1996; NASA-Case-ARC-12087-1LE; US-Patent-5,750,450; US-Patent-Appl-SN-723484; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

High temperature ablation resistant ceramic composites have been made. These ceramics are composites of zirconium diboride and zirconium carbide with silicon carbide, hafnium diboride and hafnium carbide with silicon carbide and ceramic composites which contain mixed diborides and/or carbides of zirconium and hafnium, along with silicon carbide.
Author
Ablation; Zirconium; Hafnium; Zirconium Carbides; Hafnium Carbides; Ceramic Matrix Composites; Silicon Carbides



19990088609 NASA Langley Research Center, Hampton, VA USA

Polyimide Fibers

St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Fay, Catharine C., Inventor, NASA Langley Research Center, USA; Working, Dennis C., Inventor, NASA Langley Research Center, USA; Nov. 24, 1998; 4p; In English

Patent Info.: Filed 7 May 1997; NASA-Case-LAR-15556-2; US-Patent-5,840,828; US-Patent-Appl-SN-858201; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A polyimide fiber having textile physical property characteristics and the process of melt extruding same from a polyimide powder. Polyimide powder formed as the reaction product of the monomers 3,4'-ODA and ODPA, and end- capped with phthalic anhydride to control the molecular weight thereof, is melt extruded in the temperature range of 340 C. to 360 C. and at heights of 100.5 inches, 209 inches and 364.5 inches. The fibers obtained have a diameter in the range of 0.0068 inch to 0.0147 inch; a mean tensile strength in the range of 15.6 to 23.1 ksi; a mean modulus of 406 to 465 ksi, and a mean elongation in the range of 14 to 103%.

Official Gazette of the U.S. Patent and Trademark Office

Polyimides; Fiber Composites; Fibers; Molecular Weight; Extruding

19990046082 NASA Langley Research Center, Hampton, VA USA

Copolyimides Prepared from 3,4'-Oxydianiline and 1,3-Bis(3-Aminophenoxy) Benzene with 3,3', 4,4'-Biphenylcarboxylic Dianhydride

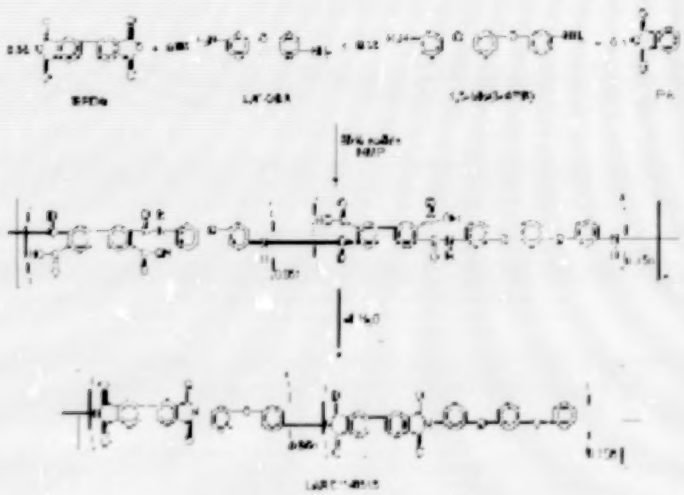
Jensen, Brian J., Inventor, NASA Langley Research Center, USA; Feb. 02, 1999; 8p; In English

Patent Info.: Filed 14 Feb. 1995; NASA-Case-LAR-15332-1; US-Patent-5,866,676; US-Patent-Appl-SN-388651; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Polyimide copolymers were prepared by reacting different ratios of 3,4'-oxydianiline (ODA) and 1,3-bis(3- aminophenoxy)benzene (APB) with 3,3',4,4'- biphenylcarboxylic dianhydride (BPDA) and endcapping with an effective amount of a nonreactive endcapper. Within a narrow ratio of diamines, from -50% ODA/50% APB to -95% ODA/5% APB, the copolyimides prepared with BPDA have a unique combination of properties that make them very attractive for various applications. This unique combination of properties includes low pressure processing (200 psi and below), long term melt stability (several hours at 390 C.), improved toughness, improved solvent resistance, improved adhesive properties, and improved composite mechanical properties.

Official Gazette of the U.S. Patent and Trademark Office

Copolymers; Diamines; Polyimides; Anhydrides; Benzene



19990046086 NASA Lewis Research Center, Cleveland, OH USA

Controlled Thermal Expansion Coat for Thermal Barrier Coatings

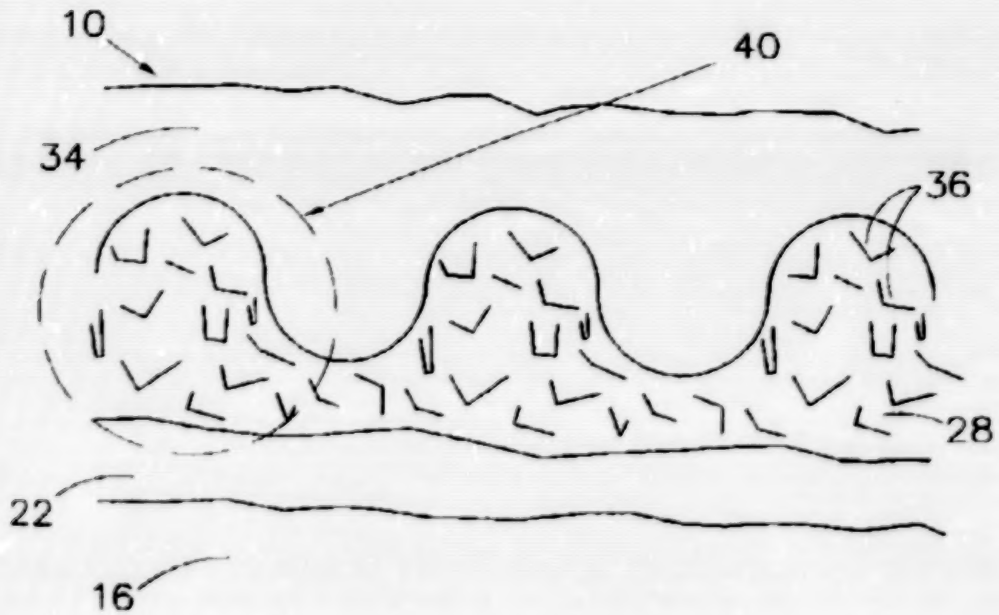
Brindley, William J., Inventor, NASA Lewis Research Center, USA; Miller, Robert A., Inventor, NASA Lewis Research Center, USA; Aikin, Beverly J. M., Inventor, NASA Lewis Research Center, USA; Jan. 26, 1999; 12p; In English

Patent Info.: Filed 29 Oct. 1997; NASA-Case-LEW-16390-1; US-Patent-5,863,668; US-Patent-Appl-SN-960309; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A improved thermal barrier coating and method for producing and applying such is disclosed herein. The thermal barrier coating includes a high temperature substrate, a first bond coat layer applied to the substrate of MCrAlX, and a second bond coat layer of MCrAlX with particles of a particulate dispersed throughout the MCrAlX and the preferred particulate is Al2O3. The particles of the particulate dispersed throughout the second bond coat layer preferably have a diameter of less then the height of the peaks of the second bond coat layer, or a diameter of less than 5 microns. The method of producing the second bond coat layer may either include the steps of mechanical alloying of particles throughout the second bond coat layer, attrition milling the particles of the particulate throughout the second bond coat layer, or using electrophoresis to disperse the particles throughout the second bond coat layer. In the preferred embodiment of the invention, the first bond coat layer is applied to the substrate, and then the second bond coat layer is thermally sprayed onto the first bond coat layer. Further, in a preferred embodiment of die invention, a ceramic insulating layer covers the second bond coat layer.

Official Gazette of the U.S. Patent and Trademark Office

Thermal Control Coatings; Ceramics; Thermal Expansion; Aluminum Oxides; Alloying



19990046779 NASA Langley Research Center, Hampton, VA USA

Thermally Stable, Piezoelectric and Pyroelectric Polymeric Substrates

Simpson, Joycely O., Inventor, NASA Langley Research Center, USA; St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Apr. 06, 1999; In English

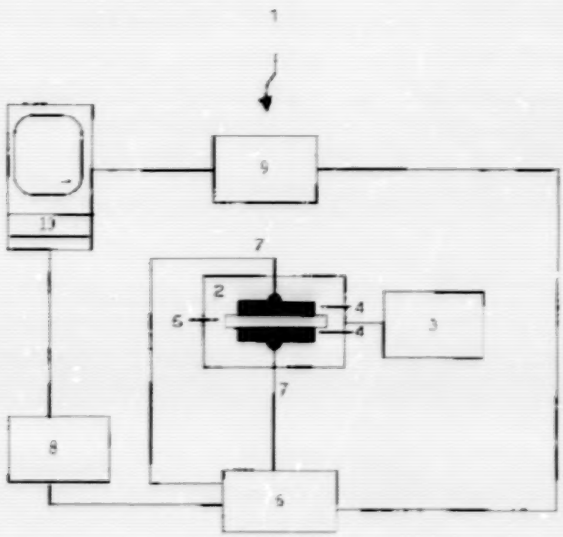
Patent Info.: Filed 7 Sep. 1995; NASA-Case-LAR-15279-1; US-Patent-5,891,581; US-Patent-Appl-SN-524855; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A thermally stable, piezoelectric and pyroelectric polymeric substrate was prepared. This thermally stable, piezoelectric and pyroelectric polymeric substrate may be used to prepare electromechanical transducers, thermomechanical transducers, accelerometers, acoustic sensors, infrared sensors, pressure sensors, vibration sensors, impact sensors, in-situ temperature sensors, in-situ stress/strain sensors, micro actuators, switches, adjustable fresnel lenses, speakers, tactile sensors, weather sensors, micro positioners, ultrasonic devices, power generators, tunable reflectors, microphones, and hydrophones. The process for preparing these polymeric substrates includes: providing a polymeric substrate having a softening temperature greater than 1000 C; depositing a metal electrode material onto the polymer film; attaching a plurality of electrical leads to the metal electrode coated polymeric substrate; heating the metal electrode coated polymeric substrate in a low dielectric medium; applying a voltage to the heated

metal electrode coated polymeric substrate to induce polarization; and cooling the polarized metal electrode coated polymeric electrode while maintaining a constant voltage.

Official Gazette of the U.S. Patent and Trademark Office

Piezoelectricity; Pyroelectricity; Substrates; Thermal Stability; Thermodynamics; Electromechanics; Transducers; Infrared Detectors; Electric Conductors



19990046780 NASA Langley Research Center, Hampton, VA USA

Dimensionally Stable Ether-Containing Polyimide Copolymers

Fay, Catharine C., Inventor, NASA Langley Research Center, USA; St.Clair, Anne K., Inventor, NASA Langley Research Center, USA; Mar. 30, 1999; In English

Patent Info.: Filed 28 Feb. 1997; NASA-Case-LAR-15572-1; US-Patent-5,889,139; US-Patent-Appl-SN-816946; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Novel polyimide copolymers containing ether linkages were prepared by the reaction of an equimolar amount of dianhydride and a combination of diamines. The polyimide copolymers described herein possess the unique features of low moisture uptake, dimensional stability, good mechanical properties, and moderate glass transition temperatures. These materials have potential application as encapsulants and interlayer dielectrics.

Official Gazette of the U.S. Patent and Trademark Office

Copolymers; Diamines; Dimensional Stability; Polyimides; Ethers

28
PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

19990046445 NASA Johnson Space Center, Houston, TX USA

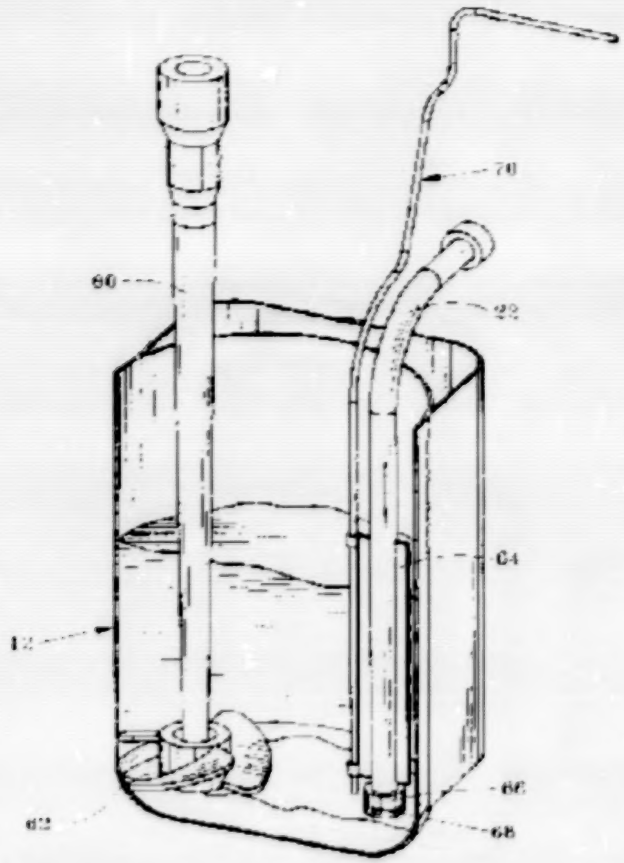
Automated Propellant Blending

Hohmann, Carl W., Inventor, NASA Johnson Space Center, USA; Harrington, Douglas W., Inventor, NASA Johnson Space Center, USA; Dutton, Maureen L., Inventor, NASA Johnson Space Center, USA; Tipton, Billy Charles, Jr., Inventor, NASA Johnson Space Center, USA; Bacak, James W., Inventor, NASA Johnson Space Center, USA; Salazar, Frank, Inventor, NASA Johnson Space Center, USA; Mar. 09, 1999; 28p; In English

Patent Info.: Filed 20 Aug. 1997; NASA-Case-MSC-22757-1; US-Patent-5,879,079; US-Patent-Appl-SN-917581; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An automated propellant blending apparatus and method uses closely metered addition of countersolvent to a binder solution with propellant particles dispersed therein to precisely control binder precipitation and particle aggregation. A profile of binder

precipitation versus countersolvent-solvent ratio is established empirically and used in a computer algorithm to establish countersolvent addition parameters near the cloud point for controlling the transition of properties of the binder during agglomeration and finishing of the propellant composition particles. The system is remotely operated by computer for safety, reliability and improved product properties, and also increases product output.
Official Gazette of the U.S. Patent and Trademark Office
Solvents; Propellants; Binders (Materials)



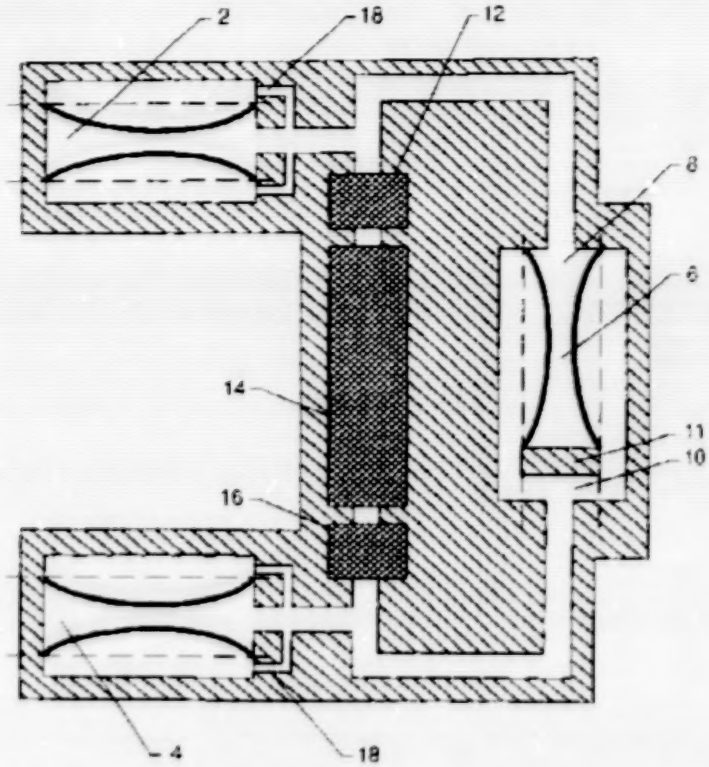
31
ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

19990046446 NASA Langley Research Center, Hampton, VA USA
Ferroelectric Stirling-Cycle Refrigerator
Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Rohrbach, Wayne W., Inventor, NASA Langley Research Center, USA; Feb. 09, 1999; In English
Patent Info.: Filed 3 Apr. 1997; NASA-Case-LAR-15664-1; US-Patent-5,867,991; US-Patent-Appl-SN-840111; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A Stirling-cycle refrigerator has a three-pump configuration and pumping sequence, in which one pump serves as a compressor, one pump serves as an expander, and one pump serves as a displacer. The pumps are ferroelectrically actuated diaphragm pumps which are coordinated by synchronizing the ferroelectric-actuator voltages in such a way that the net effect of the displacer is to reduce the deleterious effect of dead space; that is, to circulate a greater fraction of the working fluid through the heat exchangers than would be possible by use of the compressor and expander alone. In addition, the displacer can be controlled separately

to make the flow of working fluid in the heat exchangers turbulent (to increase the rate of transfer of heat at the cost of greater resistance to flow) or laminar (to decrease the resistance to flow at the cost of a lower heat-transfer rate).
Official Gazette of the U.S. Patent and Trademark Office
Compressors; Ferroelectricity; Heat Exchangers; Heat Transfer; Refrigerators; Stirling Cycle; Cryogenic Cooling; Cryogenic Equipment; Cryogenics; Low Temperature; Pumps

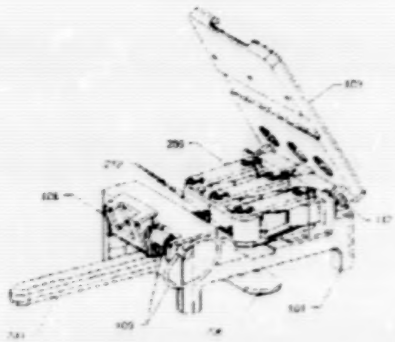


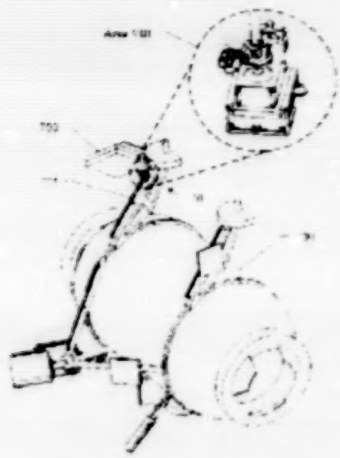
19990046784 NASA Langley Research Center, Hampton, VA USA
Combination Space Station Handrail Clamp and Pointing Device
Hughes, Stephen J., Inventor, NASA Langley Research Center, USA; Apr. 13, 1999; In English; Provisional application of US-Patent-Appl-SN-019992, filed 18 Jun. 1996
Patent Info.: Filed 18 Sep. 1996; NASA-Case-LAR-15511-1; US-Patent-5,893,533; US-Patent-Appl-SN-019992; US-Patent-Appl-SN-717203; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A device for attaching an experiment carrier to a space station handrail is provided. The device has two major components, a clamping mechanism for attachment to a space station handrail, and a pointing carrier on which an experiment package can be mounted and oriented. The handrail clamp uses an overcenter mechanism and the carrier mechanism uses an adjustable preload ball and socket for carrier positioning. The handrail clamp uses a stack of disk springs to provide a spring loaded button. This configuration provides consistent clamping force over a range of possible handrail thicknesses. Three load points are incorporated in the clamping mechanism thereby spreading the clamping load onto three separate points on the handrail. A four bar linkage is used to provide for a single actuation lever for all three load points. For additional safety, a secondary lock consisting of a capture plate and push lock keeps the clamp attached to the handrail in the event of main clamp failure. For the carrier positioning mechanism, a ball in a spring loaded socket uses friction to provide locking torque; however, the ball and socket are torque limited so

that the ball ran slip under kick loads (125 pounds or greater). A lead screw attached to disk spring stacks is used to provide an adjustable spring force on the socket. A locking knob is attached to the lead screw to allow for hand manipulation of the lead screw. Official Gazette of the U.S. Patent and Trademark Office

Clamps; Joints (Junctions); Loads (Forces); Torque





33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry. For related information see also 60 Computer Operations and Hardware and 76 Solid-State Physics.

19990008578 NASA Langley Research Center, Hampton, VA USA

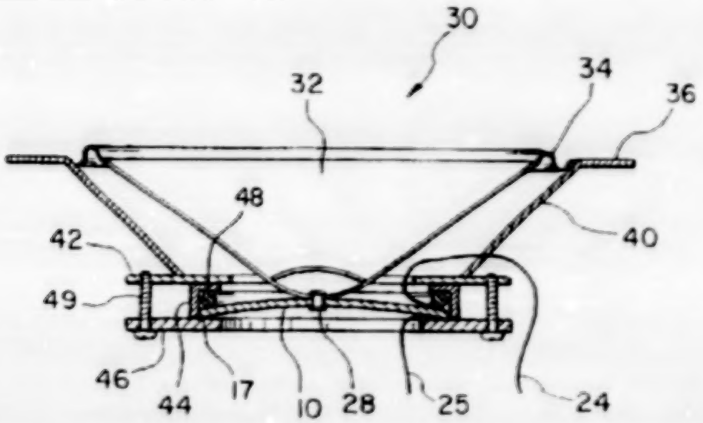
High Displacement Solid State Ferroelectric Loudspeaker

Regan, Curtis R., Inventor, NASA Langley Research Center, USA; Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Rohrbach, Wayne W., Inventor, NASA Langley Research Center, USA; Sep. 01, 1998; 8p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-326804, filed 11 Oct. 1994

Patent Info.: Filed 13 Jan. 1997; NASA-Case-LAR-15138-2; US-Patent-5,802,195; US-Patent-Appl-SN-782851; US-Patent-Appl-SN-326804; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

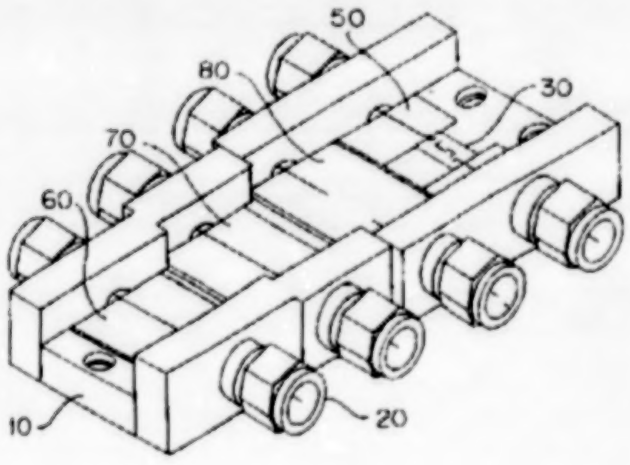
A piezoelectric loudspeaker suitable for midrange frequencies uses a dome shaped piezoelectric actuator to a speaker membrane directly is discussed. The dome shaped actuator is made from a reduced and internally biased oxygen wafer, and generates excursion of the apex of the dome in the order of 0.02-0.05 inches when a rated drive voltage of 350 V rms is applied between the convex and the concave surface of the dome shaped actuator. The load capacity exceeds 10 lbs. The edge of the rim of the dome shaped actuator must be free to rock when the dome height varies to ensure low distortion in the loudspeaker. This is achieved by mounting the rim of the dome shaped actuator on a support surface by prestress only. An exceptionally simple design uses a

planar speaker membrane with the center part of one side pressed against the rim of a dome shaped actuator by prestress from a stretched latex surround member.
Official Gazette of the U.S. Patent and Trademark Office
Ferroelectricity; Solid State; Actuators; Electric Potential; Loudspeakers; Membranes; Piezoelectricity



19990046769 NASA Lewis Research Center, Cleveland, OH USA
Method and Apparatus for Testing Microwave Devices and Circuits in a Controlled Environment
Miranda, Felix A., Inventor, NASA Lewis Research Center, USA; Toncich, Stanley S., Inventor, NASA Lewis Research Center, USA; Dec. 29, 1998; In English
Patent Info.: Filed 20 Nov. 1996; NASA-Case-LEW-20000-1; US-Patent-5,854,559; US-Patent-Appl-SN-780093; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A test system is disclosed that enables the testing of microwave components in a controlled environment without disturbing that environment. The system includes a test fixture which holds the calibration standards and the component being tested, and environmental control chamber, and a microwave switching system. The system provides a coaxial connection to microwave testing equipment, such as an automatic network analyzer (ANA) and facilitates both calibration and testing while maintaining environmental integrity.
Official Gazette of the U.S. Patent and Trademark Office
Microwave Equipment; Performance Tests; Calibrating; Environmental Tests



19990046778 NASA Johnson Space Center, Houston, TX USA

Ground Isolation Circuit for Isolating a Transmission Line from Ground Interference

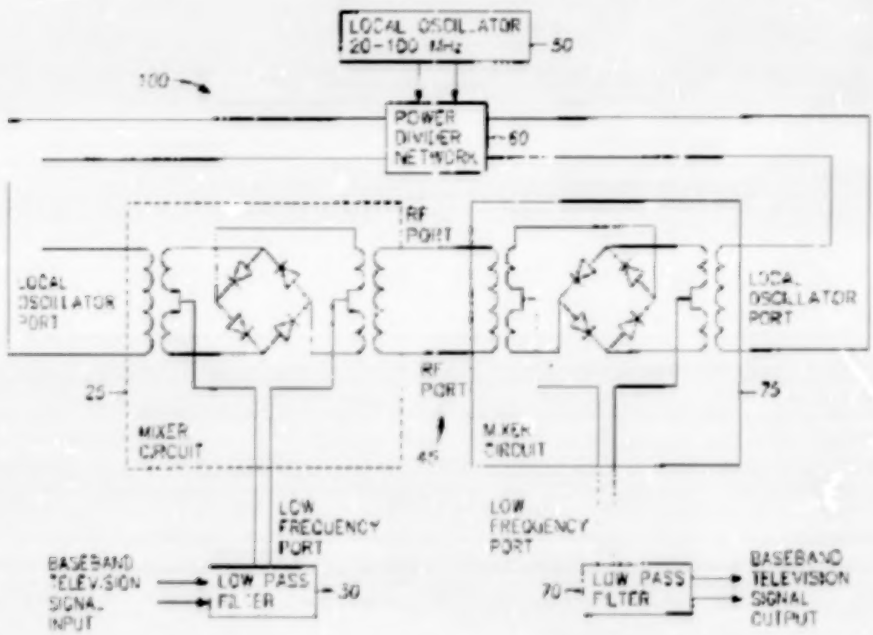
Davidson, Craig A., Inventor, NASA Johnson Space Center, USA; Nov. 24, 1998; In English

Patent Info.: Filed 1 Feb. 1996; NASA-Case-MSC-22521-1; US-Patent-5,841,467; US-Patent-Appl-SN-595312; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An isolation circuit is disclosed for isolating ground interference from a wideband transmission signal. The ground isolation circuit of the present invention is constructed using a pair of matched mixer circuits, each of which receives a carrier signal from the same oscillator circuit. The first mixer circuit also receives the baseband signal input after appropriate conditioning, and modulates the baseband signal onto the carrier signal. In the preferred embodiment, the carrier signal has a predetermined frequency which is at least two times the frequency of the baseband signal. The modulated signal (which preferably comprises an rf signal) is transmitted via an rf transmission line to the second mixer, which demodulates the rf signal to recover the baseband signal. Each port of the mixer circuits connects to an isolation transformer to insure isolation from ground interference.

Official Gazette of the U.S. Patent and Trademark Office

Transmission Lines; Radio Frequencies; Mixing Circuits; Transformers



34
FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling. For related information see also 02 Aerodynamics and 77 Thermodynamics and Statistical Physics.

19990008607 NASA Lewis Research Center, Cleveland, OH USA

Skin Friction Reduction by Micro-Blowing Technique

Hwang, Danny P., Inventor, NASA Lewis Research Center, USA; Sep. 08, 1998; 16p; In English

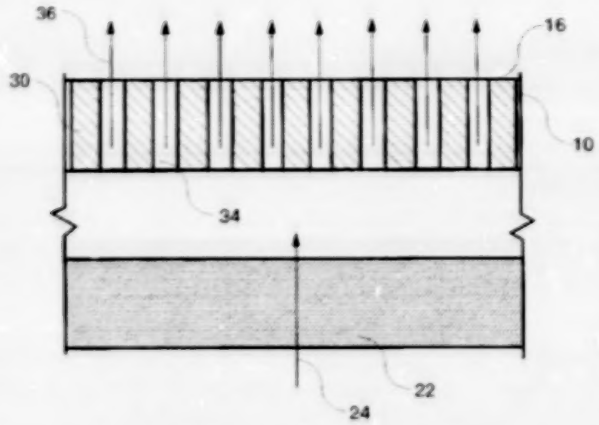
Patent Info.: Filed 1 Dec. 1995; NASA-Case-LEW-15920-1; US-Patent-5,803,410; US-Patent-Appl-SN-566211; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A system and method for reducing skin friction of an object in relative motion to a fluid. A skin forming a boundary between the object and the fluid, the skin having holes through which micro-blowing of air is blown and a transmitting mechanism for transmitting air through the skin. The skin has an inner layer and an outer layer, the inner layer being a low permeable porous sheet, the outer layer being a plate having high aspect ratio high porosity, and small holes. The system may further include a suction apparatus for suctioning air from the outer layer. The method includes the steps of transmitting air through the inner layer and

passing the air transmitted through the inner layer to the outer layer. The method may further include the step of bleeding air off the outer layer using the suction apparatus.

Author

Skin Friction; Friction Reduction; Holes (Mechanics); Porosity; Boundary Layer Control; Suction



35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography. For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Aircraft Instrumentation, and 19 Space Instrumentation.

19990008488 NASA Langley Research Center, Hampton, VA USA

Simultaneous Luminescence Pressure and Temperature Mapping

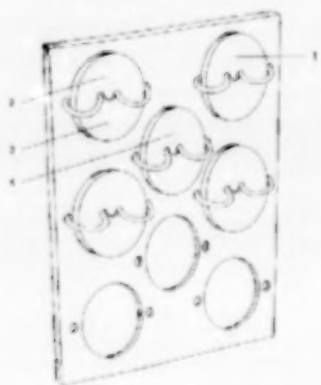
Buck, Gregory M., Inventor, NASA Langley Research Center, USA; Oct. 06, 1998; 18p; In English; Continuation of abandoned US-Patent-Appl-SN-492686, filled 20 Jun. 1995

Patent Info.: Filed 7 Oct. 1996; NASA-Case-LAR-15297-2; US-Patent-5,818,057; US-Patent-Appl-SN-726993; US-Patent-Appl-SN-492686; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A simultaneous luminescence pressure and temperature mapping system is developed including improved dye application techniques for surface temperature and pressure measurements from 5 torr to 1000 torr with possible upgrade to from 0.5 torr to several atmospheres with improved camera resolution. Adsorbed perylene dye on slip-cast silica is pressure (oxygen) sensitive and reusable to relatively high temperatures (-150 C). Adsorbed luminescence has an approximately linear color shift with temperature, which can be used for independent temperature mapping and brightness pressure calibration with temperature.

Official Gazette of the U.S. Patent and Trademark Office

Luminescence; Pressure Measurement; Surface Temperature; Mapping; Dyes



19990008544 NASA Johnson Space Center, Houston, TX USA

Fiber-Optic Chemiluminescent Biosensors for Monitoring Aqueous Alcohols and Other Water Quality Parameters

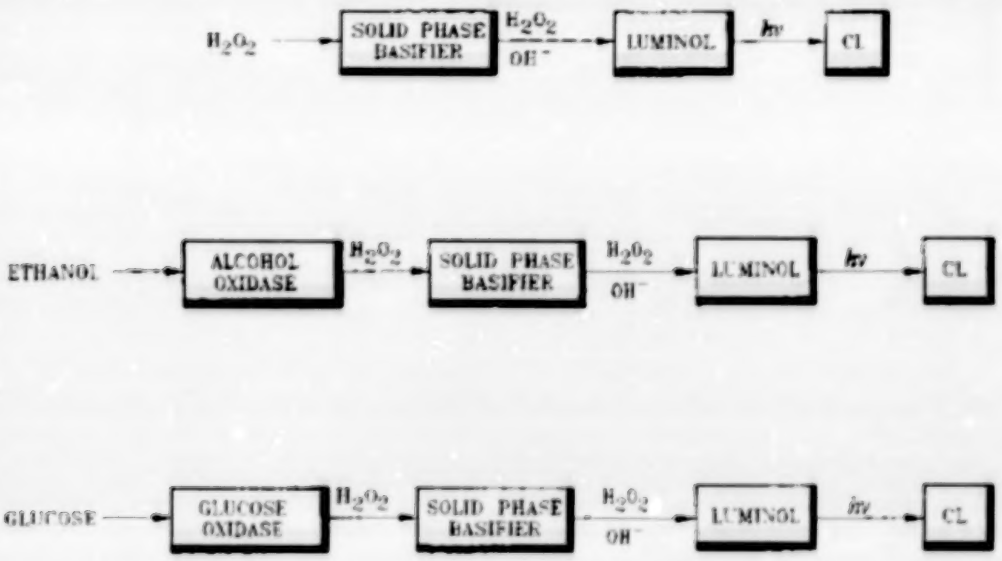
Verostko, Charles E., Inventor, NASA Johnson Space Center, USA; Atwater, James E., Inventor, NASA Johnson Space Center, USA; Akse, James R., Inventor, NASA Johnson Space Center, USA; DeHart, Jeffrey L., Inventor, NASA Johnson Space Center, USA; Wheeler, Richard R., Inventor, NASA Johnson Space Center, USA; Aug. 11, 1998; 26p; In English

Patent Info.: Filed 28 Jun. 1995; NASA-Case-MSC-22605-1-SB; US-Patent-5,792,621; US-Patent-Appl-SN-496230; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A "reagentless" chemiluminescent biosensor and method for the determination of hydrogen peroxide, ethanol and D-glucose in water is disclosed. An aqueous stream is basified by passing it through a solid phase base bed. Luminol is then dissolved in the basified effluent at a controlled rate. Oxidation of the luminol is catalyzed by the target chemical to produce emitted light. The intensity of the emitted light is detected as a measure of the target chemical concentration in the aqueous stream. The emitted light can be transmitted by a fiber optic bundle to a remote location from the aqueous stream for a remote reading of the target chemical concentration.

Official Gazette of the U.S. Patent and Trademark Office

Bioinstrumentation; Chemiluminescence; Fiber Optics; Ethyl Alcohol; Hydrogen Peroxide; Glucose



19990008577 NASA Langley Research Center, Hampton, VA USA

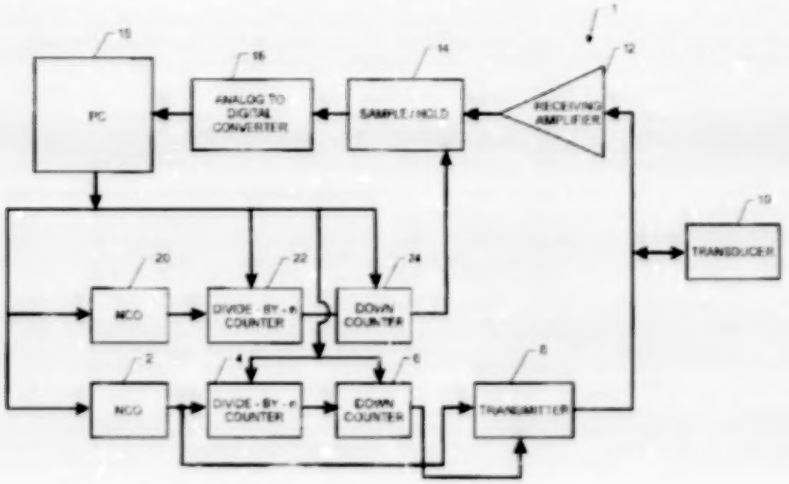
Variable and Fixed Frequency Pulsed Phase Locked Loop

Froggatt, Mark E., Inventor, NASA Langley Research Center, USA; Nov. 24, 1998; 10p; In English; Provisional US-Patent-Appl-SN-013216, filed 2 Feb. 1996

Patent Info.: Filed 24 Jan. 1997; NASA-Case-LAR-14840-1; US-Patent-5,841032; US-Patent-Appl-SN-792909; US-Patent-Appl-SN-013216; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

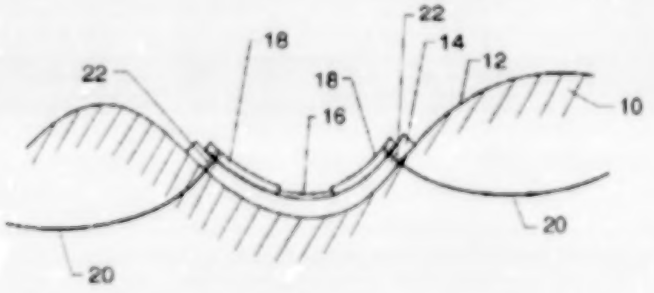
A measuring apparatus uses a variable and fixed frequency pulsed phase locked loop to measure the phase shift caused by a delay path to a high degree of accuracy. This accurate measurement of total phase change through greater than 360 degrees allows

the apparatus to measure strain in bolts or other materials. The apparatus is able to identify features on a waveform through pattern recognition, and measure untracked phase differences with better reliability than simple thresholding techniques permit.
Official Gazette of the U.S. Patent and Trademark Office
Phase Locked Systems; Phase Shift; Measuring Instruments; Waveforms; Analog to Digital Converters; Phase Detectors



19990008581 NASA Langley Research Center, Hampton, VA USA
Method of Forming a Hot Film Sensor System on a Model
Tran, Sang Q., Inventor, NASA Langley Research Center, USA; Aug. 04, 1998; 6p; In English
Patent Info.: Filed 11 Mar. 1996; NASA-Case-LAR-14732-1; US-Patent-5,789,020; US-Patent-Appl-SN-613305; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method of forming a hot film sensor directly on a model is provided. A polyimide solution is sprayed onto the model. The model so sprayed is then heated in air. The steps of spraying and heating are repeated until a polyimide film of desired thickness is achieved on the model. The model with the polyimide film thereon is then thoroughly dried in air. One or more hot film sensors and corresponding electrical conducting leads are then applied directly onto the polyimide film.
Official Gazette of the U.S. Patent and Trademark Office
Thin Films; Deposition; Forming Techniques; Measuring Instruments; Polyimides



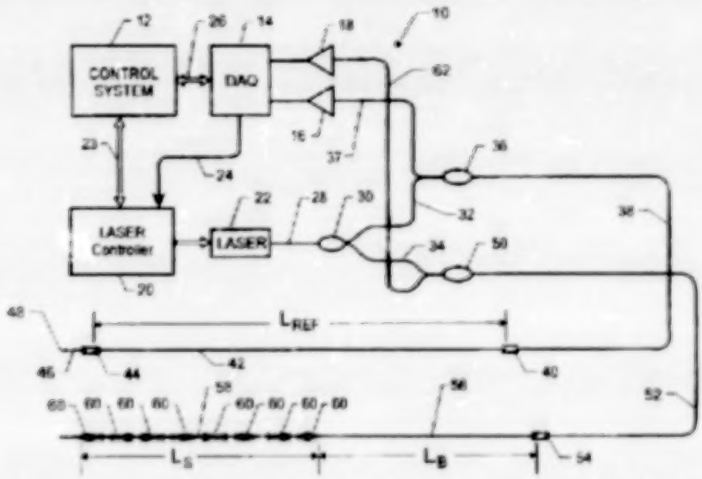
19990008587 NASA Langley Research Center, Hampton, VA USA
Apparatus and Method for Measuring Strain in Bragg Gratings
Froggatt, Mark E., Inventor, NASA Langley Research Center, USA; Aug. 25, 1998; 12p; In English
Patent Info.: Filed 27 Feb. 1997; NASA-Case-LAR-15318-1; US-Patent-5,798,521; US-Patent-Appl-SN-806732; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An apparatus and method for measuring strain of gratings written into an optical fiber is disclosed. Optical radiation is transmitted over a plurality of contiguous predetermined wavelength ranges into a reference optical fiber network and an optical fiber network under test to produce a plurality of reference interference fringes and measurement interference fringes, respectively. The

reference and measurement fringes are detected and sampled such that each sampled value of the reference and measurement fringes is associated with a corresponding sample number. The wavelength change of the reference optical fiber, for each sample number, due to the wavelength of the optical radiation is determined. Each determined wavelength change is matched with a corresponding sampled value of each measurement fringe. Each sampled measurement fringe of each wavelength sweep is transformed into a spatial domain waveform. The spatial domain waveforms are summed to form a summation spatial domain waveform that is used to determine location of each grating with respect to a reference reflector. A portion of each spatial domain waveform that corresponds to a particular grating is determined and transformed into a corresponding frequency spectrum representation. The strain on the grating at each wavelength of optical radiation is determined by determining the difference between the current wavelength and an earlier, zero-strain wavelength measurement.

Official Gazette of the U.S. Patent and Trademark Office

Strain Measurement; Bragg Gratings; Optical Fibers; Strain Rate



19990008591 NASA Langley Research Center, Hampton, VA USA

Strain Insensitive Optical Phase Locked Loop

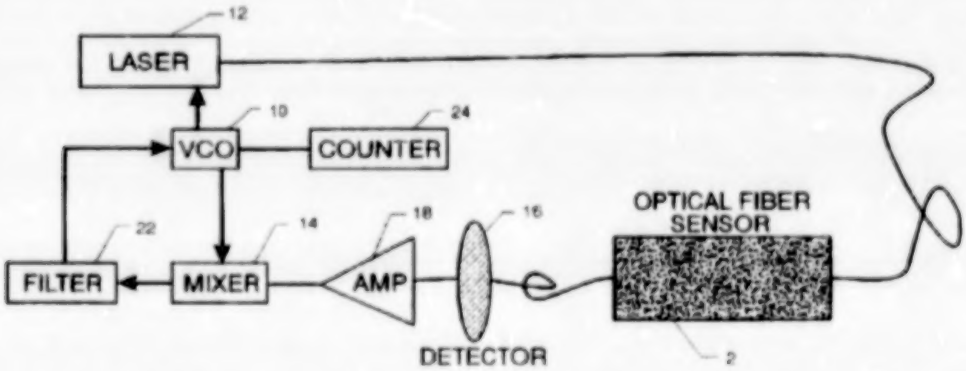
Egalon, Claudio O., Inventor, NASA Langley Research Center, USA; Rogowski, Robert S., Inventor, NASA Langley Research Center, USA; Jul. 14, 1998; 12p; In English

Patent Info.: Filed 23 Apr. 1996; NASA-Case-LAR-15159-1-SB; US-Patent-5,780,844; US-Patent-Appl-SN-644655; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A strain sensor uses optical fibers including strain insensitive portions and a strain sensitive portion. The optical fibers form a sensitive arm of an optical phase locked loop (OPLL). The use of the OPLL allows for multimode optical fiber to be used in a strain insensitive configuration. Only strain information for the strain sensitive portion is monitored rather than the integrated strain measurements commonly made with optical fiber sensors.

Official Gazette of the U.S. Patent and Trademark Office

Optical Fibers; Phase Locked Systems; Strain Measurement



19990046066 NASA Johnson Space Center, Houston, TX USA

Method of Making an Electrically Conductive Strain Gauge Material

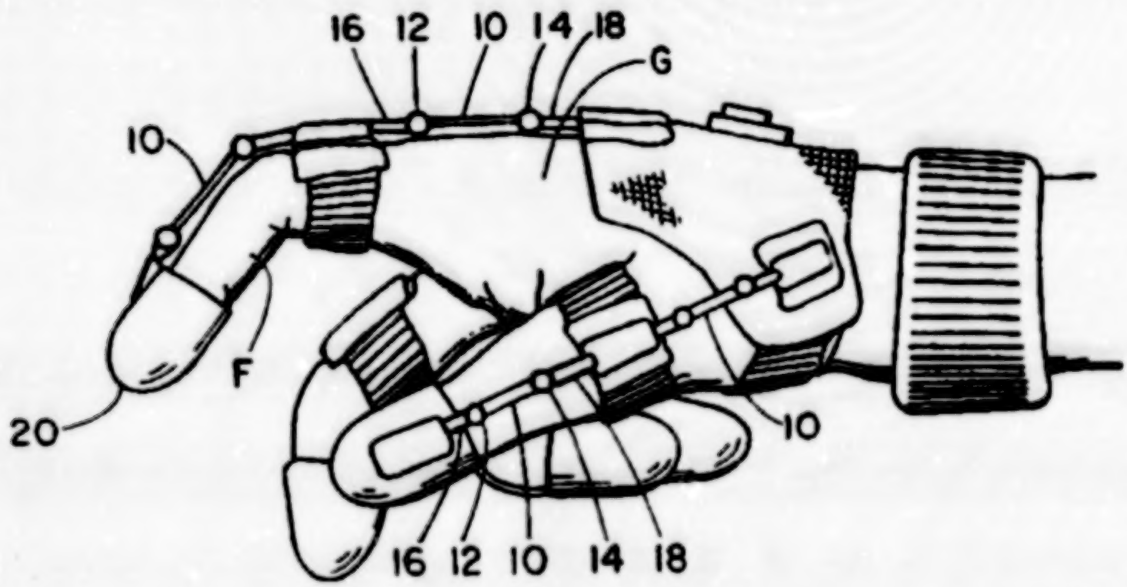
Li, Larry C. H., Inventor, NASA Johnson Space Center, USA; Dawn, Frederic S., Inventor, NASA Johnson Space Center, USA; Pesek, Todd A., Inventor, NASA Johnson Space Center, USA; Jan. 12, 1999; 8p; In English

Patent Info.: Filed 4 Mar. 1997; NASA-Case-MSC-22513-1; US-Patent-5,858,291; US-Patent-Appl-SN-810582; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved elastomeric electrically conductive strain gauge for use in virtual reality systems is disclosed which involves the flash heating of a doped ethylene vinyl acetate elastomer.

Official Gazette of the U.S. Patent and Trademark Office

Strain Gages; Elastomers; Electrical Resistivity; Virtual Reality



19990046087 NASA Kennedy Space Center, Cocoa Beach, FL USA

Two-Phase Quality/Flow Meter

Moerk, J. Steven, Inventor, NASA Kennedy Space Center, USA; Youngquist, Robert C., Inventor, NASA Kennedy Space Center, USA; Werlink, Rudy J., Inventor, NASA Kennedy Space Center, USA; Jan. 19, 1999; 10p; In English

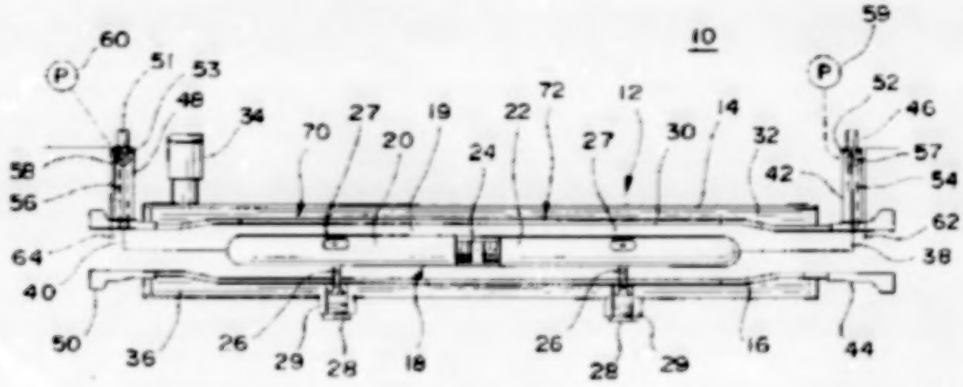
Patent Info.: Filed 6 Nov. 1995; NASA-Case-KSC-11770; US-Patent-5,861,755; US-Patent-Appl-SN-552456; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A quality and/or flow meter employs a capacitance probe assembly for measuring the dielectric constant of flow stream, particularly a two-phase flow stream including liquid and gas components.ne dielectric constant of the flow stream varies depending upon the volume ratios of its liquid and gas components, and capacitance measurements can therefore be employed to calculate the quality of the flow, which is defined as the volume ratio of liquid in the flow to the total volume ratio of gas and liquid in the flow. by using two spaced capacitance sensors, and cross-correlating the time varying capacitance values of each, the velocity of the flow stream can also be determined. A microcontroller-based processing circuit is employed to measure the capacitance of the probe sensors.The circuit employs high speed timer and counter circuits to provide a high resolution measurement of the time interval required to charge each capacitor in the probe assembly. In this manner, a high resolution, noise resistant, digital representation of each of capacitance value is obtained without the need for a high resolution A/D converter, or a high frequency oscillator

circuit. One embodiment of the probe assembly employs a capacitor with two ground plates which provide symmetry to insure that accurate measurements are made thereby.

Official Gazette of the U.S. Patent and Trademark Office

Flowmeters; Cross Correlation; Two Phase Flow; Flow Velocity



19990046088 NASA Langley Research Center, Hampton, VA USA

Thickness Gauging of Single-Layer Conductive Materials with Two-Point Non Linear Calibration Algorithm

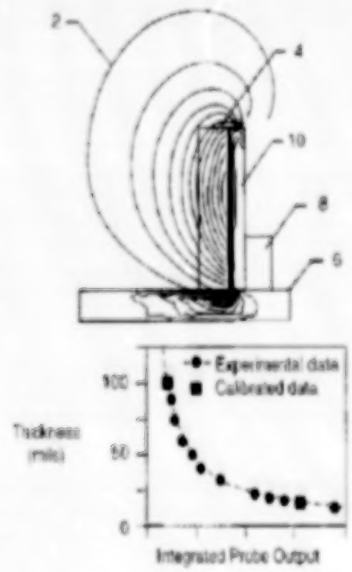
Fulton, James P., Inventor, NASA Langley Research Center, USA; Namkung, Min, Inventor, NASA Langley Research Center, USA; Simpson, John W., Inventor, NASA Langley Research Center, USA; Wincheski, Russell A., Inventor, NASA Langley Research Center, USA; Nath, Shridhar C., Inventor, NASA Langley Research Center, USA; Dec. 08, 1998; 10p; In English; Prodivisional US-Patent-Appl-SN-018182, filed 8 May 1996

Patent Info.: Filed 8 May 1997; NASA-Case-LAR-15381-1; US-Patent-5,847,562; US-Patent-Appl-SN-852990; US-Patent-Appl-SN-018182; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A thickness gauging instrument uses a flux focusing eddy current probe and two-point nonlinear calibration algorithm. The instrument is small and portable due to the simple interpretation and operational characteristics of the probe. A nonlinear interpolation scheme incorporated into the instrument enables a user to make highly accurate thickness measurements over a fairly wide calibration range from a single side of nonferromagnetic conductive metals. The instrument is very easy to use and can be calibrated quickly.

Official Gazette of the U.S. Patent and Trademark Office

Thickness; Algorithms; Nonlinearity; Eddy Currents



19990046770 NASA Johnson Space Center, Houston, TX USA

Ammonia Monitor

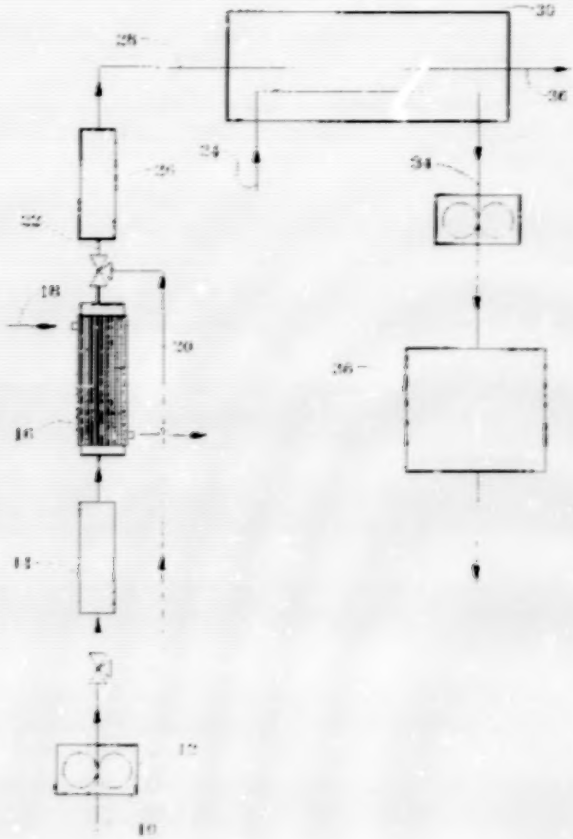
Sauer, Richard L., Inventor, NASA Johnson Space Center, USA; Akse, James R., Inventor, NASA Johnson Space Center, USA; Thompson, John O., Inventor, NASA Johnson Space Center, USA; Atwater, James E., Inventor, NASA Johnson Space Center, USA; Mar. 16, 1999; In English; Provisional application of US-Patent-Appl-SN-022526, filed 10 Jul. 1996

Patent Info.: Filed 9 Jul. 1997; NASA-Case-MSC-22270-1; US-Patent-5,882,937; US-Patent-Appl-SN-903279; US-Patent-Appl-SN-022526; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Ammonia monitor and method of use are disclosed. A continuous, real-time determination of the concentration of ammonia in an aqueous process stream is possible over a wide dynamic range of concentrations. No reagents are required because pH is controlled by an in-line solid-phase base. Ammonia is selectively transported across a membrane from the process stream to an analytical stream to an analytical stream under pH control. The specific electrical conductance of the analytical stream is measured and used to determine the concentration of ammonia.

Official Gazette of the U.S. Patent and Trademark Office

Ammonia; Real Time Operation; Solid Phases; Dynamic Range



19990046772 NASA Pasadena Office, CA USA

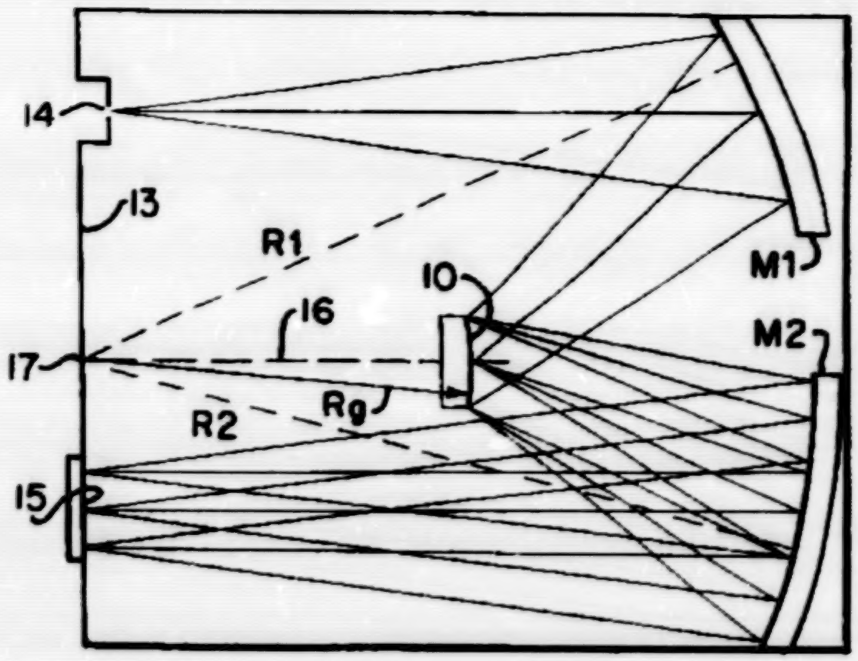
Convex Diffraction Grating Imaging Spectrometer

Chrisp, Michael P., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Mar. 09, 1999; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-733751, filed 16 Oct. 1996

Patent Info.: Filed 24 Mar. 1998; NASA-Case-NPO-19293-2; US-Patent-5,880,834; US-Patent-Appl-SN-047083; US-Patent-Appl-SN-733751; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A 1:1 Offner mirror system for imaging off-axis objects is modified by replacing a concave spherical primary mirror that is concentric with a convex secondary mirror with two concave spherical mirrors M1 and M2 of the same or different radii positioned with their respective distances d1 and d2 from a concentric convex spherical diffraction grating having its grooves parallel to the entrance slit of the spectrometer which replaces the convex secondary mirror, by adjusting their distances d1 and d2 and their respective angles of reflection alpha and beta, defined as the respective angles between their incident and reflected rays, all aberra-

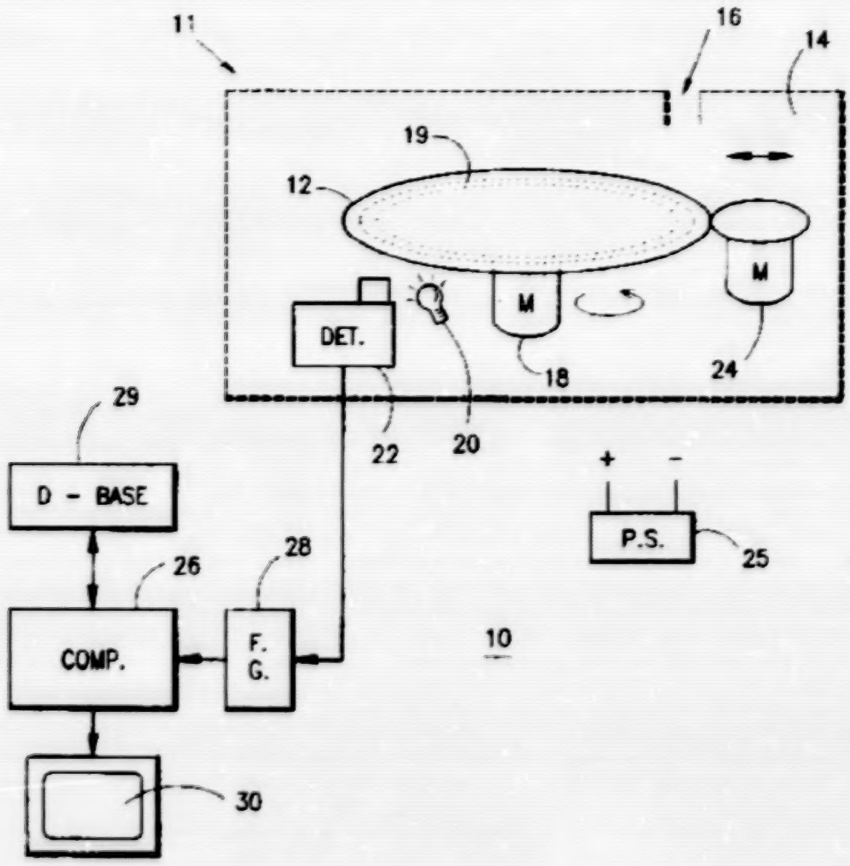
tions are corrected without the need to increase the spectrometer size for a given entrance slit size to reduce astigmatism, thus allowing the imaging spectrometer volume to be less for a given application than would be possible with conventional imaging spectrometers and still give excellent spatial and spectral imaging of the slit image spectra over the focal plane.
Official Gazette of the U.S. Patent and Trademark Office
Gratings (Spectra); Imaging Techniques; Imaging Spectrometers; Reflected Waves



19990046774 NASA Kennedy Space Center, Cocoa Beach, FL USA
Detector for Particle Surface Contamination
Mogan, Paul A., Inventor, NASA Kennedy Space Center, USA; Schwindt, Christian J., Inventor, NASA Kennedy Space Center, USA; Mattson, Carl B., Inventor, NASA Kennedy Space Center, USA; Feb. 09, 1999; In English
Patent Info.: Filed 15 Jul. 1997; NASA-Case-KSC-11809; US-Patent-5,870,186; US-Patent-Appl-SN-903196; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A system and method for detecting and quantizing particle fallout contamination particles which are collected on a transparent disk or other surface employs an optical detector, such as a CCD camera, to obtain images of the disk and a computer for analyzing the images. From the images, the computer detects, counts and sizes particles collected on the disk. The computer also determines, through comparison to previously analyzed images, the particle fallout rate, and generates an alarm or other indication if the rate exceeds a maximum allowable value. The detector and disk are disposed in a housing having an aperture formed therein for defining the area on the surface of the disk which is exposed to the particle fallout. A light source is provided for evenly illuminating the disk. A first drive motor slowly rotates the disk to increase the amount of its surface area which is exposed through the aperture

to the particle fallout. A second motor is also provided for incrementally scanning the disk in a radial direction back and forth over the camera so that the camera eventually obtains images of the entire surface of the disk which is exposed to the particle fallout.
Official Gazette of the U.S. Patent and Trademark Office
Detection; Light Sources; Illuminating



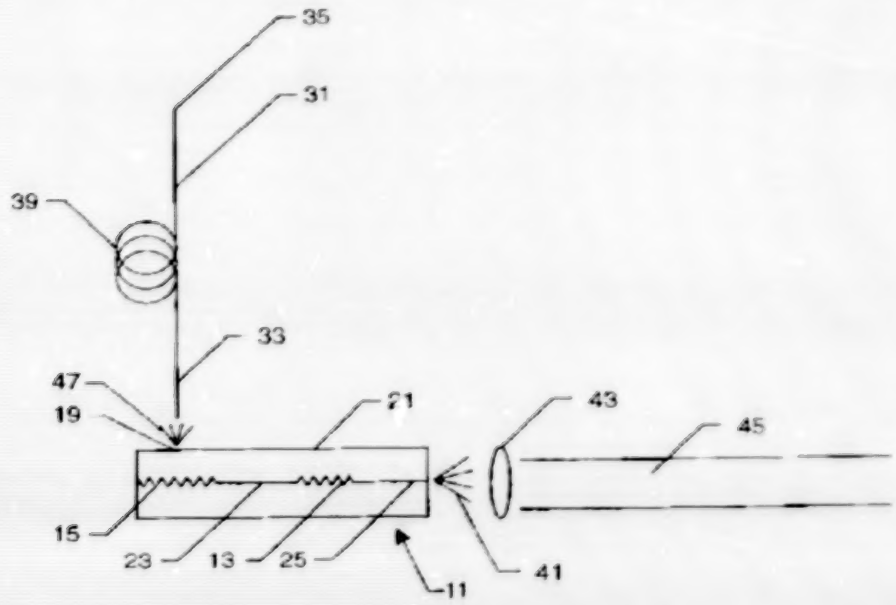
36
LASERS AND MASERS

Includes parametric amplifiers. For related information see also 76 Solid-State Physics.

19990008487 NASA Langley Research Center, Hampton, VA USA
Method and Apparatus for Linewidth Reduction in Distributed Feedback or Distributed Bragg Reflector Semiconductor Lasers using Vertical Emission
Cook, Anthony L., Inventor, NASA Langley Research Center, USA; Hendricks, Herbert D., Inventor, NASA Langley Research Center, USA; Oct. 27, 1998; 18p; In English
Patent Info.: Filed 26 Oct. 1995; NASA-Case-LAR-15258-1; US-Patent-5,828,688; US-Patent-Appl-SN-549347; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The linewidth of a distributed feedback semiconductor laser or a distributed Bragg reflector laser having one or more second order gratings is reduced by using an external cavity to couple the vertical emission back into the laser. This method and device prevent disturbance of the main laser beam, provide unobstructed access to laser emission for the formation of the external cavity, and do not require a very narrow heat sink. Any distributed Bragg reflector semiconductor laser or distributed feedback semicon-

ductor laser that can produce a vertical emission through the epitaxial material and through a window in the top metallization can be used. The external cavity can be formed with an optical fiber or with a lens and a mirror of grating.
Official Gazette of the U.S. Patent and Trademark Office
Semiconductor Lasers; Distributed Feedback Lasers; DBR Lasers; Emission; Spectral Line Width; Bragg Gratings



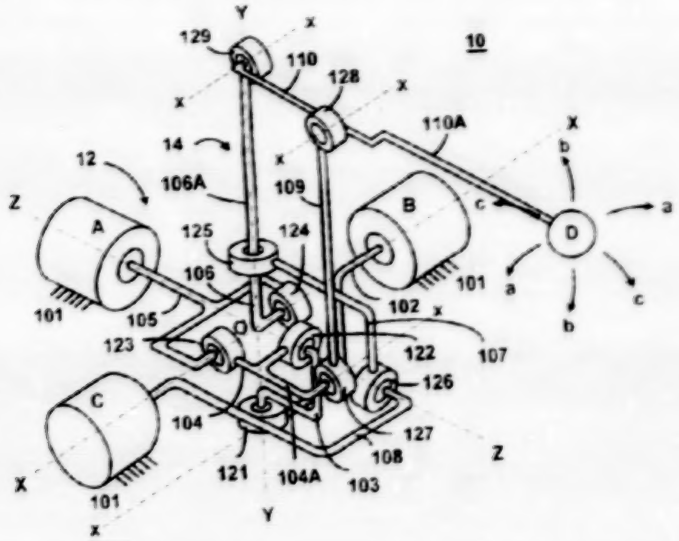
37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

19990008489 NASA Ames Research Center, Moffett Field, CA USA
Three Degree of Freedom Parallel Mechanical Linkage
Adelstein, Bernard D., Inventor, NASA Ames Research Center, USA; Oct. 06, 1998; 16p; In English
Patent Info.: Filed 26 Jul. 1996; NASA-Case-ARC-14066-1-SB; US-Patent-5,816,105; US-Patent-Appl-SN-700584; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

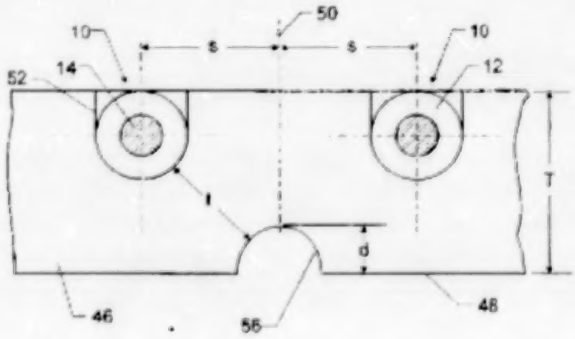
A three degree of freedom parallel mechanism or linkage that couples three degree of freedom translational displacements at an endpoint, such as a handle, a hand grip, or a robot tool, to link rotations about three axes that are fixed with respect to a common base or ground link. The mechanism includes a three degree of freedom spherical linkage formed of two closed loops, and a planar linkage connected to the endpoint. The closed loops are rotatably interconnected, and made of eight rigid links connected by a plurality of single degree of freedom revolute joints. Three of these revolute joints are base joints and are connected to a common ground, such that the axis lines passing through the revolute joints intersect at a common fixed center point K forming the center of a spherical work volume in which the endpoint is capable of moving. 'Me three degrees of freedom correspond to the spatial displacement of the endpoint, for instance. The mechanism provides a new overall spatial kinematic linkage composed of a minimal number of rigid links and rotary joints. The mechanism has improved mechanical stiffness, and conveys mechanical power bidirectionally between the human operator and the electromechanical actuators. It does not require gears, belts, cable, screw or other types of transmission elements, and is useful in applications requiring full backdrivability. Thus, this invention can

serve as the mechanical linkage for actively powered devices such as compliant robotic manipulators and force-reflecting hand controllers, and passive devices such as manual input devices for computers and other systems.
Official Gazette of the U.S. Patent and Trademark Office
Degrees of Freedom; Linkages; Mechanical Devices



19990008542 NASA Langley Research Center, Hampton, VA USA
Fracture/Severance of Materials
Schimmel, Morry L., Inventor, NASA Langley Research Center, USA; Bement, Laurence J., Inventor, NASA Langley Research Center, USA; DuBrucq, Glenn F., Jr., Inventor, NASA Langley Research Center, USA; Klein, Edward A., Inventor, NASA Langley Research Center, USA; Jul. 14, 1998; 8p; In English
Patent Info.: Filed 4 Apr. 1995; NASA-Case-LAR-15313-1-SB; US-Patent-5,780,763; US-Patent-Appl-SN-416597; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method for severing or weakening materials is discussed. Explosive cords are placed in grooves on the upper surface of the material to be severed or weakened. The explosive cords are initiated simultaneously to introduce explosive shock waves into the material. These shock waves progress toward the centerline between the explosive cords and the lower surface of the material. Intersecting and reflected waves produce a rarefaction zone on the centerline to fail the material in tension. A groove may also be cut in the lower surface of the material to aid in severing or weakening the material.
Official Gazette of the U.S. Patent and Trademark Office
Fracturing; Shock Waves; Destructive Tests; Failure Analysis; Explosions; Performance Tests



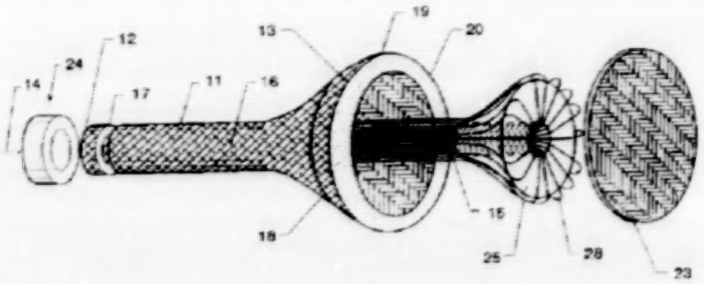
19990008545 NASA Langley Research Center, Hampton, VA USA
Method of Manufacturing Carbon Fiber Reinforced Carbon Composite Valves
Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Aug. 11, 1998; 12p; In English

Patent Info.: Filed 12 Mar. 1997; NASA-Case-LAR-15653-1; US-Patent-5,792,402; US-Patent-Appl-SN-815543; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method for forming a carbon composite valve for internal combustion engines is discussed. The process includes the steps of braiding carbon fiber into a rope thereby forming a cylindrically shaped valve stem portion and continuing to braid said fiber while introducing into the braiding carbon fiber rope a carbon matrix plug having an outer surface in a net shape of a valve head thereby forming a valve head portion. The said carbon matrix plug acting as a mandrel over which said carbon fiber rope is braided, said carbon fiber rope and carbon matrix plug forming a valve head portion suitable for mating with a valve seat; cutting said braided carbon valve stem portion at one end to form a valve tip and cutting said braided carbon fiber after said valve head portion to form a valve face and thus provide a composite valve preform; and densifying said preform by embedding the braided carbon in a matrix of carbon to convert said valve stem portion to a valve stem and said valve head portion to a valve head thereby providing said composite valve.

Official Gazette of the U.S. Patent and Trademark Office

Carbon-Carbon Composites; Valves; Manufacturing; Braided Composites



19990088549 NASA Langley Research Center, Hampton, VA USA

Carbon-Carbon Turbocharger Housing Unit for Intermittent Combustion Engines

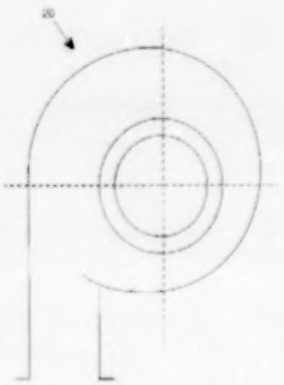
Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Sep. 22, 1998; 5p; In English; Provisional of US-Patent-Appl-SN-012940, filed 6 Mar. 1996

Patent Info.: Filed 4 Mar. 1997; NASA-Case-LAR-15496-1; US-Patent-5,810,556; US-Patent-Appl-SN-811378; US-Patent-Appl-SN-012940; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved, lightweight, turbine housing unit for an intermittent combustion reciprocating internal combustion engine turbocharger is prepared from a lay-up or molding of carbon-carbon composite materials in a single-piece or two-piece process. When compared to conventional steel or cast iron, the use of carbon-carbon composite materials in a turbine housing unit reduces the overall weight of the engine and reduces the heat energy loss used in the turbocharging process. This reduction in heat energy loss and weight reduction provides for more efficient engine operation.

Official Gazette of the U.S. Patent and Trademark Office

Carbon-Carbon Composites; Superchargers; Housings



19990008584 NASA Langley Research Center, Hampton, VA USA

Fire Resistant, Moisture Barrier Membrane

St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Aug. 04, 1998; 6p; In English; Provisional application No. 60/008,765, 15 Dec. 1995

Patent Info.: Filed 9 Dec. 1996; NASA-Case-LAR-15437-1; US-Patent-5,789,025; US-Patent-Appl-SN-772052; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A waterproof and breathable, fire-resistant laminate is provided for use in tents, garments, shoes, and covers, especially in industrial, military and emergency situations. The laminate permits water vapor evaporation while simultaneously preventing liquid water penetration. Further, the laminate is fire-resistant and significantly reduces the danger of toxic compound production when exposed to flame or other high heat source. The laminate may be applied to a variety of substrates and is comprised of a silicone rubber and plurality of fire-resistant, inherently thermally-stable polyimide particles.

Official Gazette of the U.S. Patent and Trademark Office

Fires; Thermal Stability; Moisture; Membranes; Waterproofing; Thermal Resistance

19990008592 NASA Johnson Space Center, Houston, TX USA

Misalignment Accommodating Connector Assembly

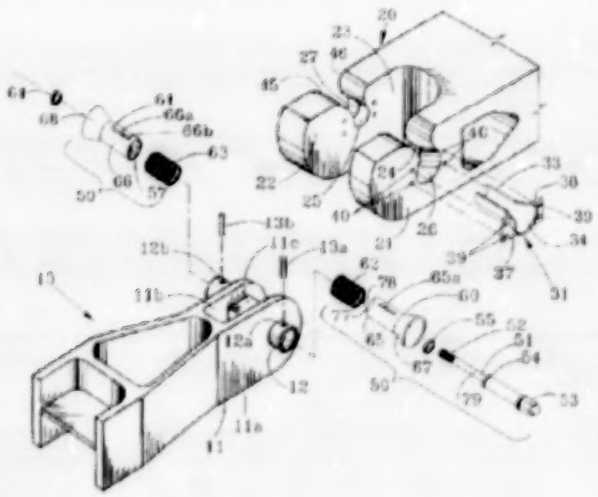
Stemper, Jack S., Inventor, NASA Johnson Space Center, USA; Sep. 15, 1998; 8p; In English

Patent Info.: Filed 19 Dec. 1996; NASA-Case-MSC-52325-1; US-Patent-5,807,007; US-Patent-Appl-SN-786843; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Misalignment accommodating connector assembly for removably connecting first and second objects which may comprise: a first connector subassembly having an arm member extending therefrom transversely through which is provided a tubular member; a second connector subassembly having a pair of spaced apart arm members each of which is provided with a transversely disposed coaxially aligned semi-cylindrical recess for receiving opposite ends of the first connector tubular member upon lateral insertion of the first connector arm member into the space between the second connector pair of arm members. An axially extendable and contractible fastener subassembly carried by the first connector tubular member is extendable to allow insertion or removal of the first connector arm member into or from the space between the second connector pair of arm members and contractible when the opposite ends of the tubular member are substantially received by the semi-cylindrical recesses of the pair of spaced apart arm members to lock the first and second connector subassemblies together.

Official Gazette of the U.S. Patent and Trademark Office

Misalignment; Subassemblies; Connectors



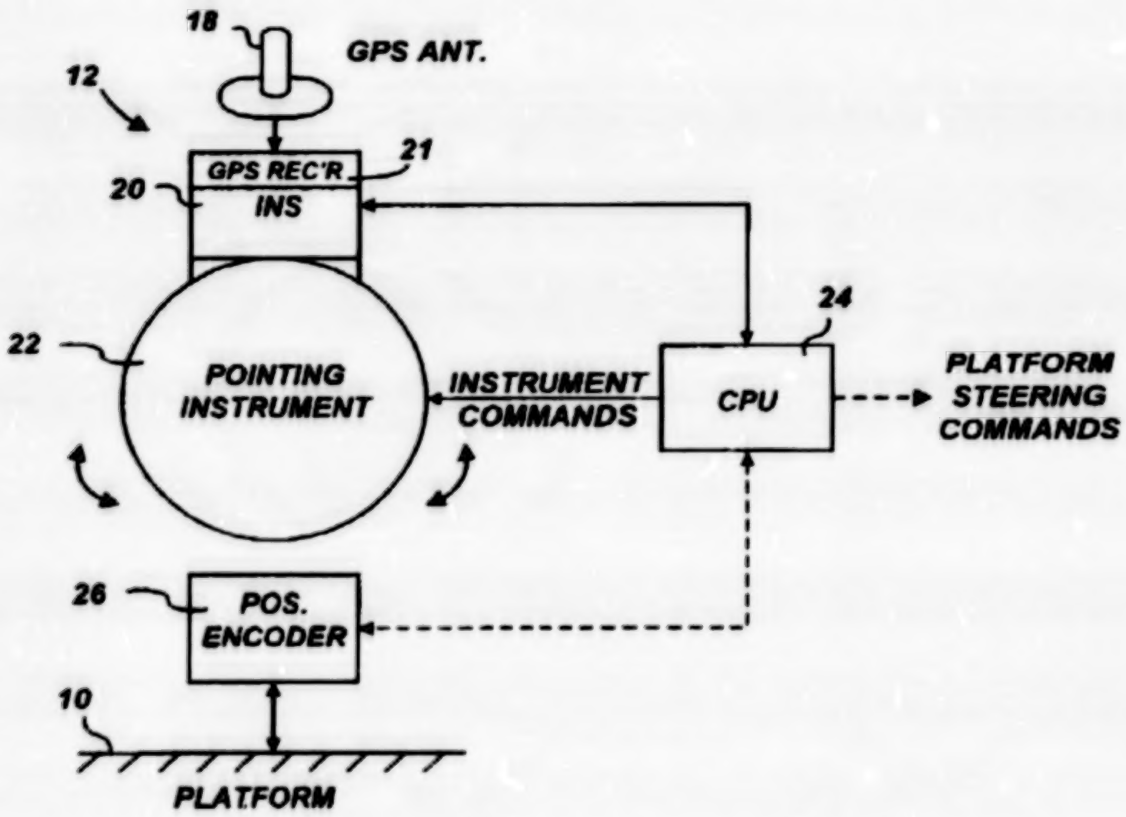
19990008610 NASA Ames Research Center, Moffett Field, CA USA

Inertial Pointing and Positioning System

Yee, Robert, Inventor, NASA Ames Research Center, USA; Robbins, Fred, Inventor, NASA Ames Research Center, USA; Sep. 15, 1998; 15p; In English

Patent Info.: Filed 8 Mar. 1996; NASA-Case-ARC-14060-1LE; US-Patent-5,809,457; US-Patent-Appl-SN-614784; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

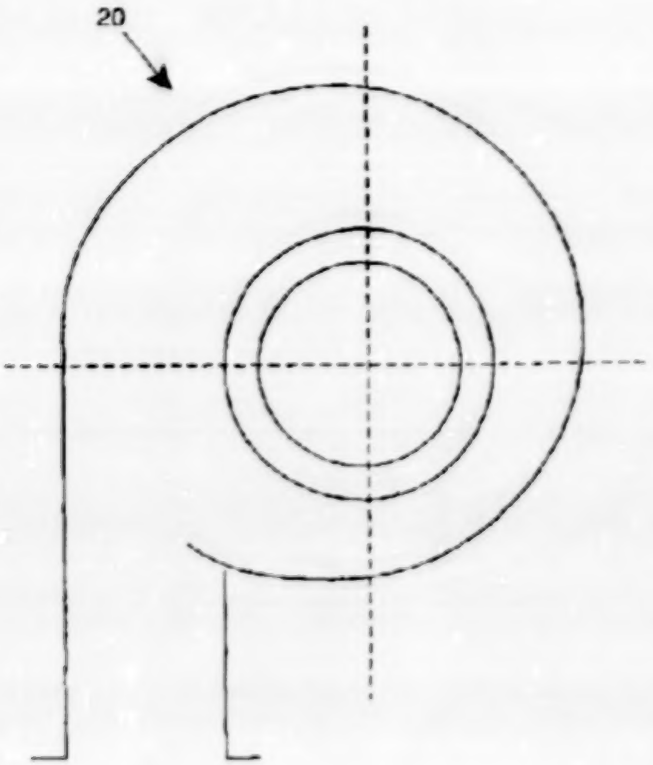
An inertial pointing and control system and method for pointing to a designated target with known coordinates from a platform to provide accurate position, steering, and command information. The system continuously receives GPS signals and corrects Inertial Navigation System (INS) dead reckoning or drift errors. An INS is mounted directly on a pointing instrument rather than in a remote location on the platform for-monitoring the terrestrial position and instrument attitude. and for pointing the instrument at designated celestial targets or ground based landmarks. As a result. the pointing instrument and die INS move independently in inertial space from the platform since the INS is decoupled from the platform. Another important characteristic of the present system is that selected INS measurements are combined with predefined coordinate transformation equations and control logic algorithms under computer control in order to generate inertial pointing commands to the pointing instrument. More specifically. the computer calculates the desired instrument angles (Phi, Theta. Psi). which are then compared to the Euler angles measured by the instrument- mounted INS. and forms the pointing command error angles as a result of the compared difference.
Official Gazette of the U.S. Patent and Trademark Office
Control Systems Design; Dead Reckoning; Inertial Navigation; Sequential Control; Targets



19990046783 NASA Langley Research Center, Hampton, VA USA
Process for Making Carbon-Carbon Turbocharger Housing Unit for Intermittent Combustion Engines
Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; May 04, 1999; In English; Division of US-Patent-Appl-SN-811378, filed 4 Mar. 1997 and Provisional Application of US-Patent-Appl-SN-012940, filed 6 Mar. 1996
Patent Info.: Filed 3 Nov. 1997; NASA-Case-LAR-15496-2; US-Patent-5,900,089; US-Patent-Appl-SN-963291; US-Patent-Appl-SN-811378; US-Patent-Appl-SN-012940; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved. lightweight, turbine housing unit for an intermittent combustion reciprocating internal combustion engine turbocharger is prepared from a lay-up or molding of carbon-carbon composite materials in a single-piece or two-piece process. When compared to conventional steel or cast iron, the use of carbon-carbon composite materials in a turbine housing unit reduces

the overall weight of the engine and reduces the heat energy loss used in the turbo-charging process. This reduction in heat energy loss and weight reduction provides for more efficient engine operation.
Official Gazette of the U.S. Patent and Trademark Office
Turbocompressors; Carbon-Carbon Composites; Housings; Superchargers; Iron Alloys



38
QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

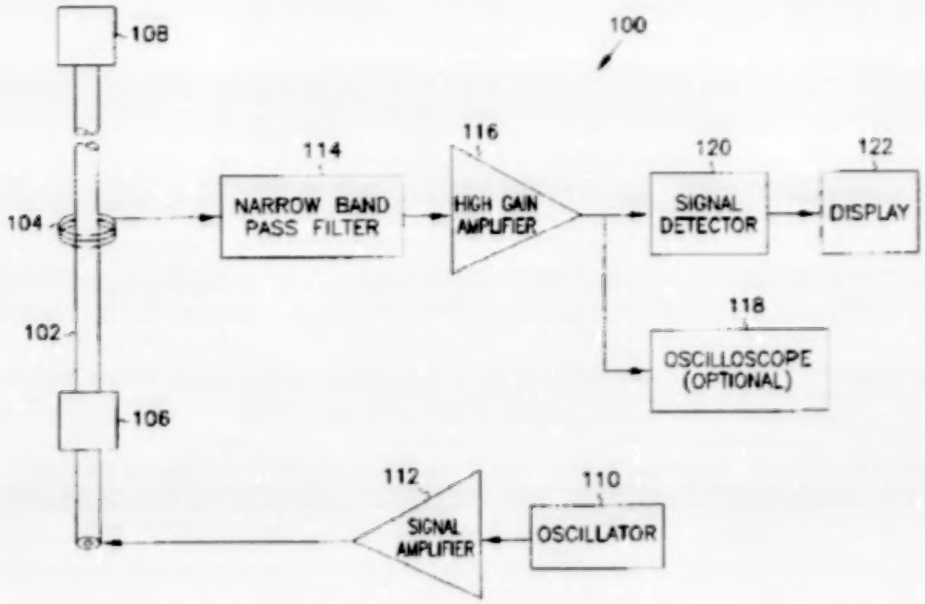
19990046781 NASA Kennedy Space Center, Cocoa Beach, FL USA
Non-Intrusive Cable Tester
Medelius, Pedro J., Inventor, NASA Kennedy Space Center, USA; Simpson, Howard J., Inventor, NASA Kennedy Space Center, USA; Apr. 13, 1999; In English
Patent Info.: Filed 24 Sep. 1997; NASA-Case-KSC-11865; US-Patent-5,894,223; US-Patent-Appl-SN-936643; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A cable tester is described for low frequency testing of a cable for faults. The tester allows for testing a cable beyond a point where a signal conditioner is installed, minimizing the number of connections which have to be disconnected. A magnetic pickup coil is described for detecting a test signal injected into the cable. A narrow bandpass filter is described for increasing detection of the test signal. The bandpass filter reduces noise so that a high gain amplifier provided for detecting a test signal is not completely saturate by noise. to further increase the accuracy of the cable tester, processing gain is achieved by comparing the signal

from the amplifier with at least one reference signal emulating the low frequency input signal injected into the cable. Different processing techniques are described evaluating a detected signal.

Official Gazette of the U.S. Patent and Trademark Office

Nonintrusive Measurement; Signal Detection; Bandpass Filters



39
STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress. For applications see 05 Aircraft Design, Testing and Performance and 18 Spacecraft Design, Testing and Performance.

19990008580 NASA Langley Research Center, Hampton, VA USA

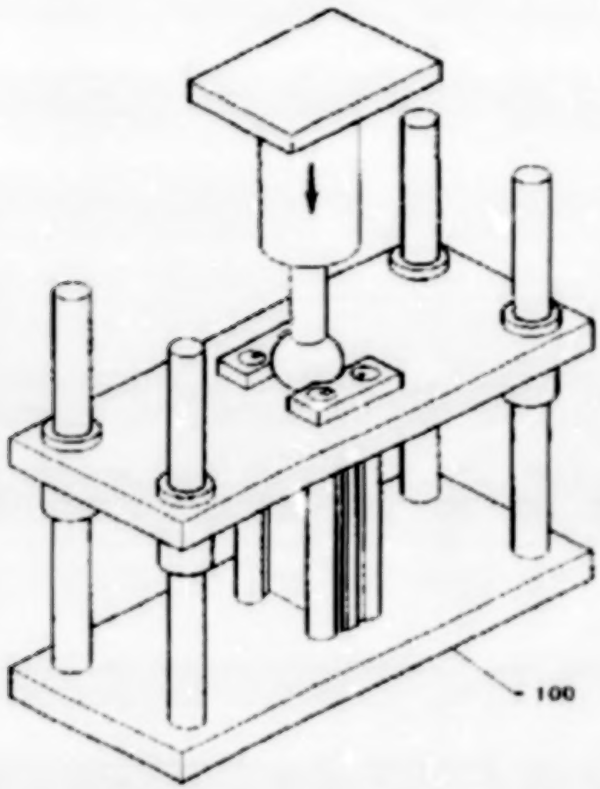
Test Fixture for Determination of Energy Absorbing Capabilities of Composite Materials

Lavoie, J. Andre, Inventor, NASA Langley Research Center, USA; Jackson, Karen E., Inventor, NASA Langley Research Center, USA; Morton, John, Inventor, NASA Langley Research Center, USA; Sep. 22, 1998; 10p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-306556, filed 13 Sep. 1994

Patent Info.: Filed 24 Jun. 1997; NASA-Case-LAR-15212-2-CU; US-Patent-5,811,686; US-Patent-Appl-SN-881626; US-Patent-Appl-SN-306556; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention provides a fixture for supporting an elongated specimen for crush testing. The fixture comprises a base plate, four guiding rods, a sliding plate, four support rods and two collars. The guiding rods connect to the base plate and extend in a direction substantially perpendicular to the base plate. The sliding plate has linear bearings which encircle the guiding rods and enable translation of the sliding plate along the axis of each guiding rod. The four supporting rods mount to the base plate and also extend in a direction substantially perpendicular to the base plate. Each support rod has a keyway for a wedge which contacts the elongated specimen and holds the specimen in place during crushing. Each collar lies above the sliding plate and holds

a pair of support rods on their ends opposite the ends connected to the base plate. A spherical bearing sits on top of the sliding plate and transfers an applied load to the sliding plate, which moves downward and crushes the elongated specimen.
Official Gazette of the U.S. Patent and Trademark Office
Absorbers (Materials); Crushing; Inventions



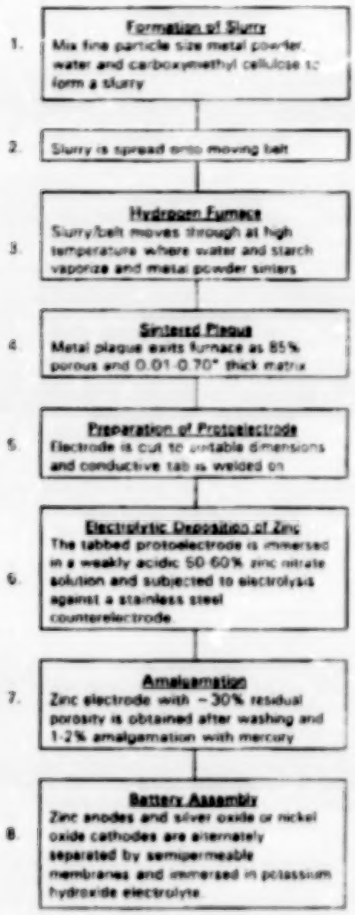
44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.

19990008583 NASA Johnson Space Center, Houston, TX USA
High performance zinc anode for battery applications
Casey, John E., Jr., Inventor, NASA Johnson Space Center, USA; Jul. 14, 1998; 10p; In English
Patent Info.: Filed 9 May 1996; NASA-Case-MSC-22540-1; US-Patent-5,780,186; US-Patent-Appl-SN-649858; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An improved zinc anode for use in a high density rechargeable alkaline battery is disclosed. A process for making the zinc electrode comprises electrolytic loading of the zinc active material from a slightly acidic zinc nitrate solution into a substrate of nickel, copper or silver. The substrate comprises a sintered plaque having very fine pores, a high surface area, and 80-85 percent total initial porosity. The residual porosity after zinc loading is approximately 25-30%. The electrode of the present invention

exhibits reduced zinc mobility, shape change and distortion, and demonstrates reduced dendrite buildup cycling of the battery. The disclosed battery is useful for applications requiring high energy density and multiple charge capability.
Official Gazette of the U.S. Patent and Trademark Office
Alkaline Batteries; Electrode Materials; Nickel Zinc Batteries; Substrates; Porous Materials; Zinc; Anodes; Deposition


1. Formation of Slurry
Mix fine particle size metal powder, water and carboxymethyl cellulose to form a slurry
2. Slurry is spread onto moving belt
3. Hydrogen Furnace
Slurry/belt moves through at high temperature where water and starch vaporize and metal powder sinters
4. Sintered Plaque
Metal plaque exits furnace as 85% porous and 0.01-0.70" thick matrix
5. Preparation of Protoelectrode
Electrode is cut to portable dimensions and conductive tab is welded on
6. Electrolytic Deposition of Zinc
The tabbed protoelectrode is immersed in a weakly acidic 50-60% zinc nitrate solution and subjected to electrolysis against a stainless steel counterelectrode.
7. Amalgamation
Zinc electrode with ~30% residual porosity is obtained after washing and 1-2% amalgamation with mercury
8. Battery Assembly
Zinc anodes and silver oxide or nickel oxide cathodes are alternately separated by semipermeable membranes and immersed in potassium hydroxide electrolyte.

51
LIFE SCIENCES (GENERAL)

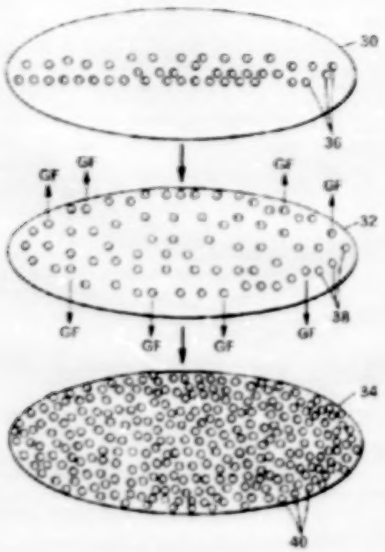
19990088604 NASA Marshall Space Flight Center, Huntsville, AL USA
Media Compositions for Three-Dimensional Mammalian Tissue Growth under Microgravity Culture Conditions
Goodwin, Thomas J., Inventor, NASA Marshall Space Flight Center, USA; Dec. 08, 1998; 14p; In English
Patent Info.: Filed 13 Feb. 1886; NASA-Case-MSC-21984-2; US-Patent-5,846,807; US-Patent-Appl-SN-600793; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Normal mammalian tissue and the culturing process has been developed for the three groups of organ, structural and blood tissue. The cells are grown in vitro under microgravity culture conditions and form three dimensional cells aggregates with normal

cell function. The microgravity culture conditions may be microgravity or simulated microgravity created in a horizontal rotating wall culture vessel.

Official Gazette of the U.S. Patent and Trademark Office

Tissues (Biology); Mammals; Microgravity; Procedures



19990046070 NASA Johnson Space Center, Houston, TX USA

Production of Normal Mammalian Organ Culture Using a Medium Containing Mem-Alpha, Leibovitz L 15, Glucose Galactose Fructose

Goodwin, Thomas J., Inventor, NASA Johnson Space Center, USA; Wolf, David A., Inventor, NASA Johnson Space Center, USA; Spaulding, Glenn F., Inventor, NASA Johnson Space Center, USA; Prewett, Tacey L., Inventor, NASA Johnson Space Center, USA; Jan. 12, 1999; 16p; In English; Division of US-Patent-Appl-SN-66292, filed 25 May 1993

Patent Info.: Filed 1 Mar. 1996; NASA-Case-MSC-21984-3; US-Patent-5,858,783; US-Patent-Appl-SN-613793; US-Patent-Appl-SN-066292; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Normal mammalian tissue and the culturing process has been developed for the three groups of organ, structural and blood tissue. The cells are grown in vitro under micro- gravity culture conditions and form three dimensional cells aggregates with normal cell function. The microgravity culture conditions may be microgravity or simulated microgravity created in a horizontal rotating wall culture vessel. The medium used for culturing the cells, especially a mixture of epithelial and mesenchymal cells contains a mixture of Mem-alpha and Leibovits L15 supplemented with glucose, galactose and fructose.

Official Gazette of the U.S. Patent and Trademark Office

Culture Techniques; Microgravity; Mammals; Cytology; Organs

FIG. 1

19990046689 NASA Johnson Space Center, Houston, TX USA

Media Compositions for Three Dimensional Mammalian Tissue Growth Under Microgravity Culture Conditions

Goodwin, Thomas J., Inventor, NASA Johnson Space Center, USA; Dec. 08, 1998; 14p; In English; Division of US-Patent-Appl-SN-66292, filed 25 May 1993

Patent Info.: Filed 13 Feb. 1996; NASA-Case-MSC-21984-2; US-Patent-5,846,807; US-Patent-Appl-SN-600793; US-Patent Appl-SN-66292; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Normal mammalian tissue and the culturing process has been developed for the three groups of organ, structural and blood tissue. The cells are grown in vitro under microgravity culture conditions and form three dimensional cells aggregates with normal cell function. The microgravity culture conditions may be microgravity or simulated microgravity created in a horizontal rotating wall culture vessel.

Official Gazette of the U.S. Patent and Trademark Office

Microgravity; Tissues (Biology); Blood; Cytology; Culture Techniques

Fig. 1

52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19990008605 NASA Langley Research Center, Hampton, VA USA

Digital Mammography with a Mosaic of CCD Arrays

Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; McAdoo, James A., Inventor, NASA Langley Research Center, USA; Dec. 01, 1998; 11p; In English

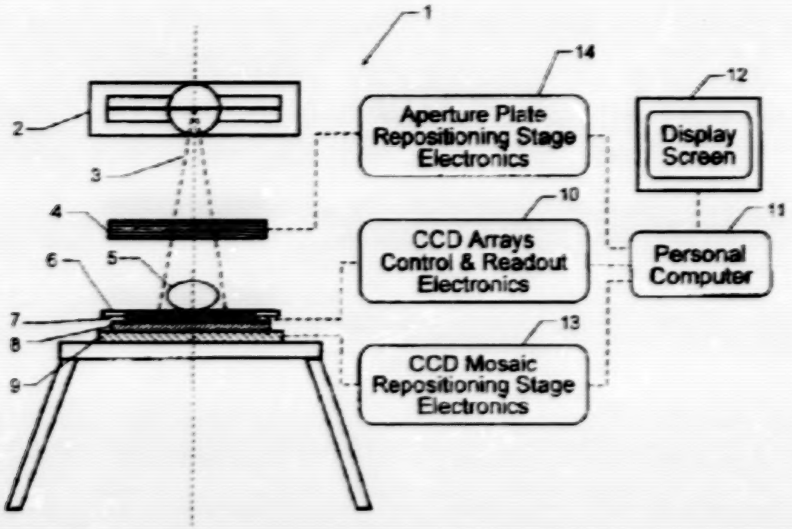
Patent Info.: Filed 26 Jan. 1996; NASA-Case-LAR-15059-1; US-Patent-5,844,242; US-Patent-Appl-SN-601143; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A digital mammography device uses a mosaic of electronic digital imaging arrays to scan an x-ray image is discussed. The mosaic of arrays is repositioned several times to expose different portions of the image, until the entire image is scanned. The data generated by the arrays during each exposure is stored in a computer. After the final exposure, the computer combines data of the

several partial images to produce a composite of the original x-ray image. An aperture plate is used to reduce scatter and the overall exposure of the patient to x-rays.

Official Gazette of the U.S. Patent and Trademark Office

Medical Equipment; X Ray Imagery; Imaging Techniques; Image Processing; Radiography; Biotechnology



19980046068 NASA Johnson Space Center, Houston, TX USA

Cultured High-Fidelity Three-Dimensional Human Urogenital Tract Carcinomas and Process

Goodwin, Thomas J., Inventor, NASA Johnson Space Center, USA; Prewett, Tacey L., Inventor, NASA Johnson Space Center, USA; Spaulding, Glenn F., Inventor, NASA Johnson Space Center, USA; Wolf, David A., Inventor, NASA Johnson Space Center, USA; Dec. 22, 1998; 12p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-939791, filed 3 Sep. 1992

Patent Info.: Filed 27 Dec. 1993; NASA-Case-MSC-22119-1; US-Patent-5,851,816; US-Patent-Appl-SN-172962; US-Patent-Appl-SN-939791; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

Artificial high-fidelity three-dimensional human urogenital tract carcinomas are propagated under in vitro-microgravity conditions from carcinoma cells. Artificial high-fidelity three-dimensional human urogenital tract carcinomas are also propagated from a coculture of normal urogenital tract cells inoculated with carcinoma cells. The microgravity culture conditions may be microgravity or simulated microgravity created in a horizontal rotating wall culture vessel.

Official Gazette of the U.S. Patent and Trademark Office

Culture Techniques; Microgravity; Cancer

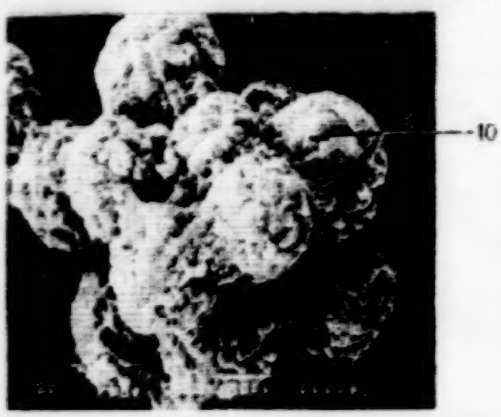


FIG. 1

19990046084 NASA Johnson Space Center, Houston, TX USA

Method and Apparatus for the Collection, Storage, and Real Time Analysis of Blood and Other Bodily Fluids

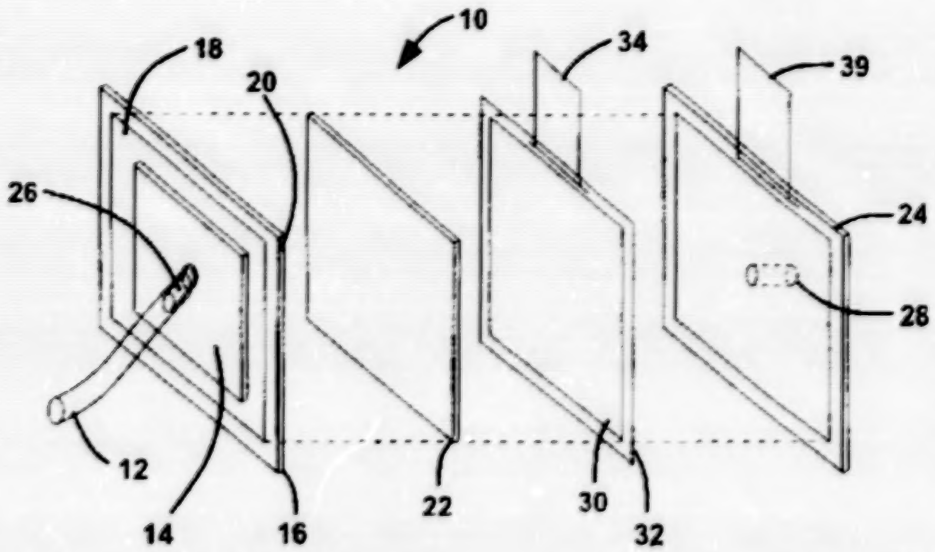
Whiitson, Peggy A., Inventor, NASA Johnson Space Center, USA; Clift, Vaughan L., Inventor, NASA Johnson Space Center, USA; Feb. 02, 1999; 10p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-605300, filed 26 Jan. 1996

Patent Info.: Filed 7 Mar. 1997; NASA-Case-MSC-22463-3; US-Patent-5,866,007; US-Patent-Appl-SN-813570; US-Patent-Appl-SN-605300; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention provides a method and apparatus for separating a blood sample having a volume of up to about 20 milliliters into cellular and acellular fractions. The apparatus includes a housing divided by a fibrous filter into a blood sample collection chamber having a volume of at least about 1 milliliter and a serum sample collection chamber. The fibrous filter has a pore size of less than about 3 microns, and is coated with a mixture including between about 1-40 wt/vol % mannitol and between about 0.1-15 wt/vol % of plasma fraction protein (or an animal or vegetable equivalent thereof). The coating causes the cellular fraction to be trapped by the small pores, leaving the cellular fraction intact on the fibrous filter while the acellular fraction passes through the filter for collection in unaltered form from the serum sample collection chamber.

Official Gazette of the U.S. Patent and Trademark Office

Blood; Real Time Operation; Plasmas (Physics)



19990046203 NASA Marshall Space Flight Center, Huntsville, AL USA

Quantitative Method of Measuring Metastatic Activity

Morrison, Dennis R., Inventor, NASA Marshall Space Flight Center, USA; Feb. 09, 1999; In English; Continuation of abandoned US-Patent-Appl-SN-97186, filed 27 Jul. 1993

Patent Info.: Filed 16 Feb. 1995; NASA-CASE-MSC-21715-2; US-Patent-5,869,238; US-Patent-Appl-SN-390904; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The metastatic potential of tumors can be evaluated by the quantitative detection of urokinase and DNA. The cell sample selected for examination is analyzed for the presence of high levels of urokinase and abnormal DNA using analytical flow cytometry and digital image analysis. Other factors such as membrane associated uroldnase, increased DNA synthesis rates and certain receptors can be used in the method for detection of potentially invasive tumors.

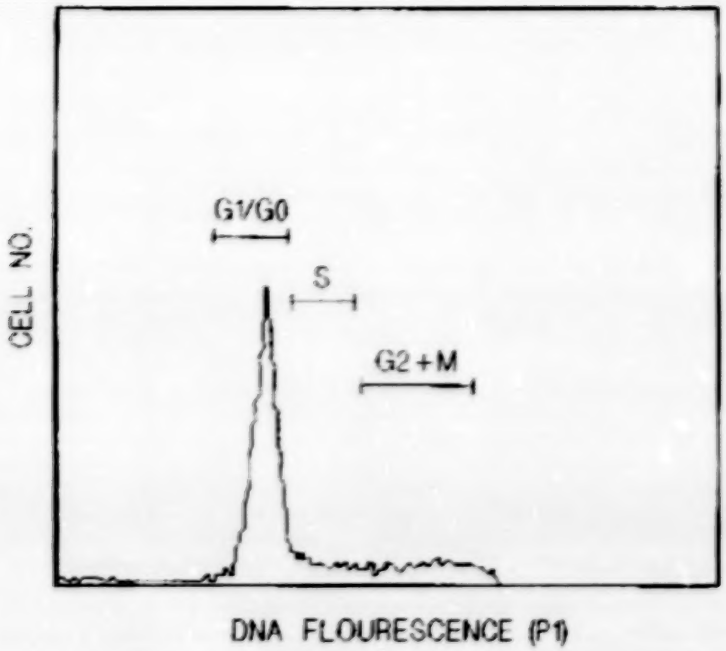


FIG. 1A

60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing. For components see 33 Electronics and Electrical Engineering.

19990008585 NASA Pasadena Office, CA USA

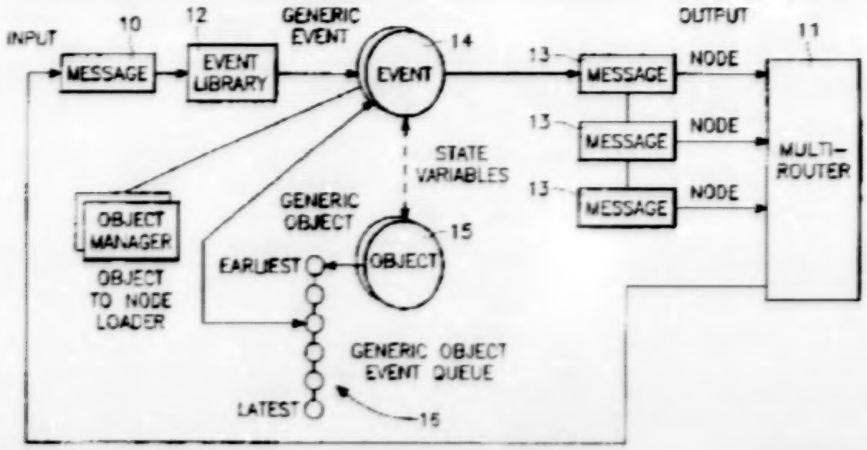
Synchronous Parallel Emulation and Discrete Event Simulation System with Self-Contained Simulation Objects and Active Event Objects

Steinman, Jeffrey S., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Aug. 11, 1998; 32p; In English; Continuation-in-part of abandoned US-Patent-Appl-SN-246372, filed 13 Mar. 1994, which is a continuation-in-part of abandoned US-Patent-Appl-SN-880211, filed 21 Jan. 1992

Patent Info.: Filed 12 Dec. 1994; NASA-Case-NPO-18414-3-CU; US-Patent-Appl-SN-363546; US-Patent-Appl-SN-246372; US-Patent-5,794,005; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention is embodied in a method of performing object-oriented simulation and a system having inter-connected processor nodes operating in parallel to simulate mutual interactions of a set of discrete simulation objects distributed among the nodes as a sequence of discrete events changing state variables of respective simulation objects so as to generate new event-defining messages addressed to respective ones of the nodes. The object-oriented simulation is performed at each one of the nodes by assigning passive self-contained simulation objects to each one of the nodes, responding to messages received at one node by generating corresponding active event objects having user-defined inherent capabilities and individual time stamps and corresponding to respective events affecting one of the passive self-contained simulation objects of the one node, restricting the respective passive self-contained simulation objects to only providing and receiving information from die respective active event objects,

requesting information and changing variables within a passive self-contained simulation object by the active event object, and producing corresponding messages specifying events resulting therefrom by the active event objects.
Official Gazette of the U.S. Patent and Trademark Office
Object-Oriented Programming; Computerized Simulation; Message Processing

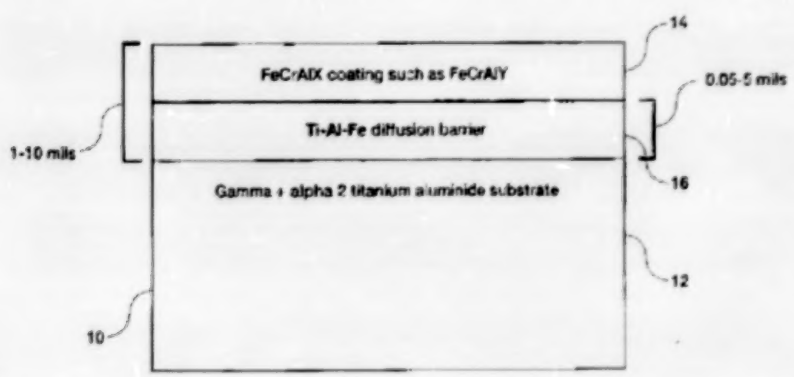


62
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

19990008541 NASA Lewis Research Center, Cleveland, OH USA
Oxidation-Resistant TI-AL-FE Alloy Diffusion Barrier Coatings
Brady, Michael P., Inventor, NASA Lewis Research Center, USA; Smialek, James L., Inventor, NASA Lewis Research Center, USA; Brindley, William J., Inventor, NASA Lewis Research Center, USA; Jul. 07, 1998; 7p; In English
Patent Info.: Filed 21 Oct. 1996; NASA-Case-LEW-200006-1; US-Patent-5,776,617; US-Patent-Appl-SN-735368; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A diffusion barrier to help protect titanium aluminide alloys, including the coated alloys of the TiAl(gamma)+Ti3Al (alpha (sub 2)) class, from oxidative attack and interstitial embrittlement at temperatures up to at least 1000 C is disclosed. The coating may comprise FeCrAlX alloys. The diffusion barrier comprises titanium, aluminum, and iron in the following approximate atomic percent: Ti-(50-55)Al-(9-20)Fe. This alloy is also suitable as an oxidative or structural coating for such substrates.
Official Gazette of the U.S. Patent and Trademark Office
Titanium Aluminides; Protective Coatings; Aluminum Alloys; Titanium Alloys; Embrittlement; Metal Coatings; Iron



19990008590 NASA Pasadena Office, CA USA

Parallel Proximity Detection for Computer Simulations

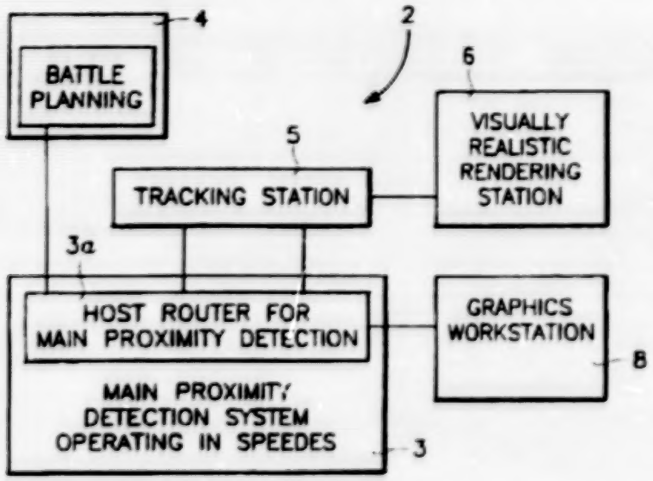
Steinman, Jeffrey S., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Wieland, Frederick P., Inventor, Jet Propulsion Lab., California Inst. of Tech., USA; Jul. 14, 1998; 18p; In English; Division of US-Patent-Appl-SN-425751, filed 10 Apr. 1995, US-Patent-5,652,871

Patent Info.: Filed 7 Mar. 1997; NASA-Case-NPO-19423-2; US-Patent-Appl-SN-813531; US-Patent-Appl-SN-425751; US-Patent-5,781,762; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention discloses a system for performing proximity detection in computer simulations on parallel processing architectures utilizing a distribution list which includes movers and sensor coverages which check in and out of grids. Each mover maintains a list of sensors that detect the mover's motion as the mover and sensor coverages check in and out of the grids. Fuzzy grids are included by fuzzy resolution parameters to allow movers and sensor coverages to check in and out of grids without computing exact grid crossings. The movers check in and out of grids while moving sensors periodically inform the grids of their coverage. In addition, a lookahead function is also included for providing a generalized capability without making any limiting assumptions about the particular application to which it is applied. The lookahead function is initiated so that risk-free synchronization strategies never roll back grid events. The lookahead function adds fixed delays as events are scheduled for objects on other nodes.

Official Gazette of the U.S. Patent and Trademark Office

Architecture (Computers); Parallel Processing (Computers); Computerized Simulation



19990008611 NASA Ames Research Center, Moffett Field, CA USA

Scalable Hierarchical Network Management System for Displaying Network Information in Three Dimensions

George, Jude, Inventor, NASA Ames Research Center, USA; Schlecht, Leslie, Inventor, NASA Ames Research Center, USA; McCabe, James D., Inventor, NASA Ames Research Center, USA; LeKashman, John Jr., Inventor, NASA Ames Research Center, USA; Jun. 30, 1998; 71p; In English

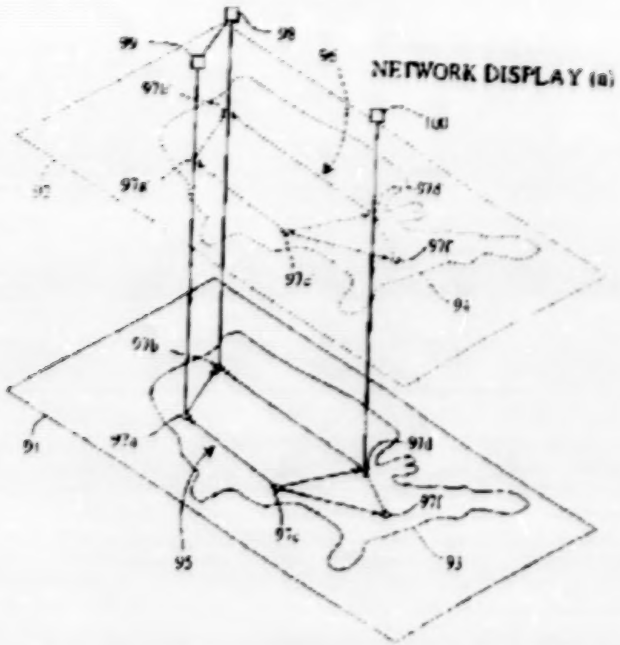
Patent Info.: Filed 28 Jul. 1995; NASA-Case-ARC-12097-1LE; US-Patent-5,774,669; US-Patent-Appl-SN-505723; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A network management system has SNMP agents distributed at one or more sites, an input output module at each site, and a server module located at a selected site for communicating with input output modules, each of which is configured for both SNMP and HNMP communications. The server module is configured exclusively for HNMP communications, and it communi-

cates with each input output module according to the HNMP. Non-iconified, informationally complete views are provided of network elements to aid in network management.

Official Gazette of the U.S. Patent and Trademark Office

Management Systems; Networks



63
CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems. For related information see also 54 Man/System Technology and Life Support.

19990008593 NASA Johnson Space Center, Houston, TX USA

Real-Time Reconfigurable Adaptive Speech Recognition Command and Control Apparatus and Method

Salazar, George A., Inventor, NASA Johnson Space Center, USA; Haynes, Dena S., Inventor, NASA Johnson Space Center, USA; Sommers, Marc J., Inventor, NASA Johnson Space Center, USA; Jun. 30, 1998; 26p; In English

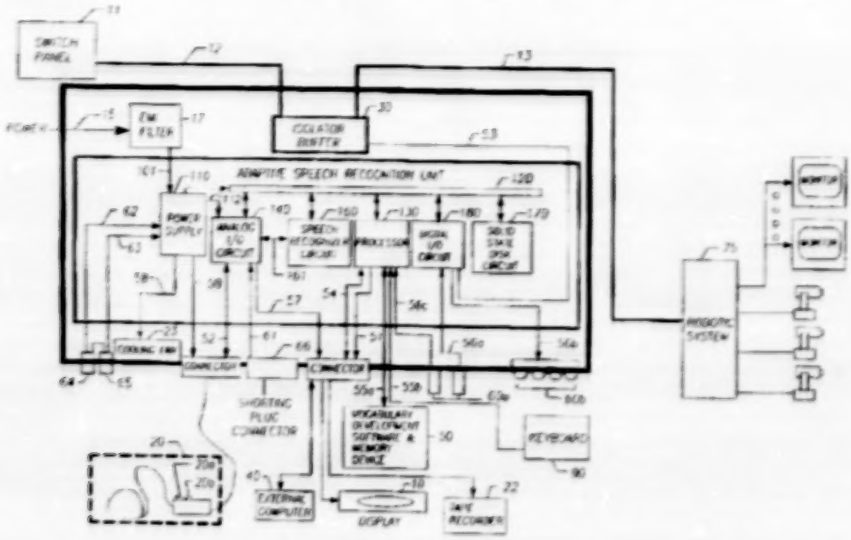
Patent Info.: Filed 20 Sep. 1995; NASA-Case-MSC-22532-1; US-Patent-5,774,841; US-Patent-Appl-SN-536302; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An adaptive speech recognition and control system and method for controlling various mechanisms and systems in response to spoken instructions and in which spoken commands are effective to direct the system into appropriate memory nodes, and to respective appropriate memory templates corresponding to the voiced command is discussed. Spoken commands from any of a group of operators for which the system is trained may be identified, and voice templates are updated as required in response to changes in pronunciation and voice characteristics over time of any of the operators for which the system is trained. Provisions are made for both near-real-time retraining of the system with respect to individual terms which are determined not be positively identified, and for an overall system training and updating process in which recognition of each command and vocabulary term is checked, and in which the memory templates are retrained if necessary for respective commands or vocabulary terms with respect to an operator currently using the system. In one embodiment, the system includes input circuitry connected to a micro-

phone and including signal processing and control sections for sensing the level of vocabulary recognition over a given period and, if recognition performance falls below a given level, processing audio-derived signals for enhancing recognition performance of the system.

Official Gazette of the U.S. Patent and Trademark Office

Speech Recognition; Command and Control; Signal Processing; Voice Control; Adaptive Control; Voice Data Processing



19990046069 NASA Pasadena Office, CA USA

Priority Queues for Computer Simulations

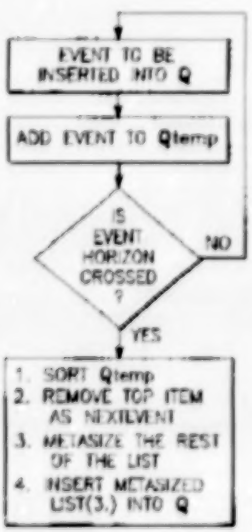
Steinman, Jeffrey S., Inventor, NASA Pasadena Office, USA; Dec. 15, 1998; 24p; In English

Patent Info.: Filed 23 Apr. 1997; NASA-Case-NPO-20095-1; US-Patent-Appl-SN-845262; US-Patent-5,850,538; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

The present invention is embodied in new priority queue data structures for event list management of computer simulations, and includes a new priority queue data structure and an improved event horizon applied to priority queue data structures. ne new priority queue data structure is a Qheap and is made out of linked lists for robust, fast, reliable, and stable event list management and' uses a temporary unsorted list to store all items until one of the items is needed. Then the list is sorted, next, the highest priority item is removed, and then the rest of the list is inserted in the Qheap. Also, an event horizon is applied to binary tree and splay tree priority queue data structures to form the improved event horizon for event management.

Official Gazette of the U.S. Patent and Trademark Office

Computerized Simulation; Priorities; Data Structures


EVENT TO BE INSERTED INTO Q
ADD EVENT TO Qtemp
IS EVENT HORIZON CROSSED ?
NO
YES
1. SORT Qtemp
2. REMOVE TOP ITEM AS NEXTEVENT
3. METASIZE THE REST OF THE LIST
4. INSERT METASIZED LIST(3.) INTO Q

72
ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure, electron properties, and molecular spectra.

19990008608 NASA Langley Research Center, Hampton, VA USA

Small Vacuum Compatible Hyperthermal Atom Generator

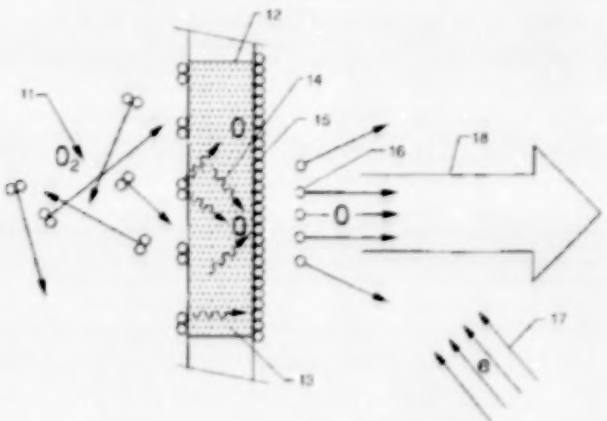
Outlaw, Ronald A., Inventor, NASA Langley Research Center, USA; Davidson, Mark R., Inventor, NASA Langley Research Center, USA; Nov. 10, 1998; 18p; In English

Patent Info.: Filed 15 Aug. 1996; NASA-Case-LAR-15338-2; US-Patent-5,834,768; US-Patent-Appl-SN-698541; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A vacuum compatible hyperthermal atom generator includes a membrane having two sides, the membrane having the capability of dissolving atoms into the membrane's bulk. A first housing is furnished in operative association with the first side of the membrane to provide for the exposure of the first side of the membrane to a gas species. A second housing is furnished in operative association with the second side of the membrane to provide a vacuum environment having a pressure of less than 1 x 10(exp -3) Torr on the second side of the membrane. Exciting means excites atoms adsorbed on the second side of the membrane to a non-binding state so that a portion from 0% to 100% of atoms adsorbed on the second side of is the membrane are released from the second side of the membrane primarily as an atom beam.

Author

Atomic Beams; Gas Composition; Membranes; Vacuum Chambers; Particle Diffusion; Vacuum Systems



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OPTICS

Includes light phenomena, and optical devices. For lasers see 36 Lasers and Masers.

19990008582 NASA Johnson Space Center, Houston, TX USA

Apparatus and Method for Focusing a Light Beam in a Three-Dimensional Recording Medium by a Dynamic Holographic Device

Juday, Richard D., Inventor, NASA Johnson Space Center, USA; Jun. 16, 1998; 20p; In English

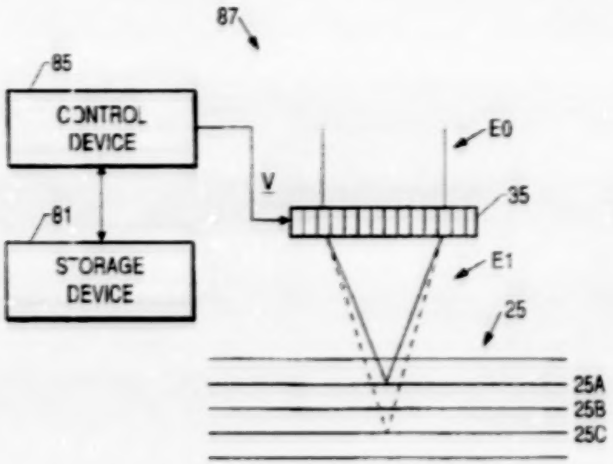
Patent Info.: Filed 5 Apr. 1996; NASA-Case-MSC-22746-1; US-Patent-5,768,242; US-Patent-Appl-SN-629360; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An apparatus is disclosed for reading and/or writing information or to from an optical recording medium having a plurality of information storage layers. The apparatus includes a dynamic holographic optical element configured to focus light on the optical recording medium, a control circuit arranged to supply a drive signal to the holographic optical element, and a storage device in communication with the control circuit and storing at least a first drive signal and a second drive signal. The holographic optical element focusses light on a first one of the plurality of information storage layers when driven by the first drive signal on a second one of the plurality of information storage layers when driven by the second drive signal. An optical switch is also disclosed for connecting at least one light source in a source array to at least one light receiver in a receiver array. The switch includes a dynamic holographic optical element configured to receive light from the source array and to transmit light to the receiver array, a control

circuit arranged to supply a drive signal to the holographic optical element, and a storage device in communication with the control circuit and storing at least a first drive signal and a second drive signal. The holographic optical element connects a first light source in the source array to a first light receiver in the receiver array when driven by the first drive signal and the holographic optical element connects the first light source with the first light receiver and a second light receiver when driven by the second drive signal.

Official Gazette of the U.S. Patent and Trademark Office

Light Beams; Focusing; Light Modulators; Holographic Optical Elements; Light Modulation; Communication Equipment



19990088606 NASA Lewis Research Center, Cleveland, OH USA

Integrated Fluorescence

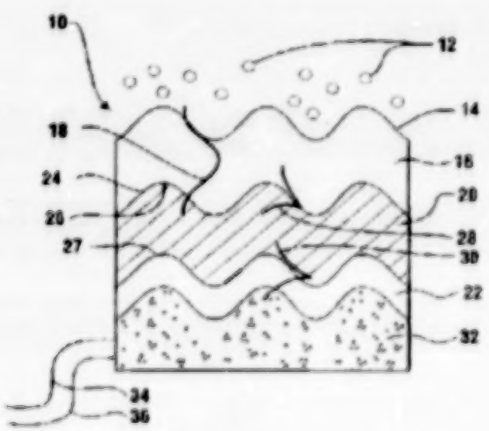
Tuma, Margaret, Inventor, NASA Lewis Research Center, USA; Gruhlke, Russell W., Inventor, NASA Lewis Research Center, USA; Nov. 24, 1998; 8p; In English

Patent Info.: Filed 11 Jul. 1997; NASA-Case-LEW-16368-1; US-Patent-5,841,143; US-Patent-Appl-SN-903184; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A detection method is integrated with a filtering method and an enhancement method to create a fluorescence sensor that can be miniaturized. The fluorescence sensor comprises a thin film geometry including a waveguide layer, a metal film layer and sensor layer. The thin film geometry of the fluorescence sensor allows the detection of fluorescent radiation over a narrow wavelength interval. This enables wavelength discrimination and eliminates the detection of unwanted light from unknown or spurious sources.

Official Gazette of the U.S. Patent and Trademark Office

Fluorescence; Detection; Miniaturization; Radiation Detectors



19990046071 NASA Johnson Space Center, Houston, TX USA

Method and Apparatus for Improved Spatial Light Modulation

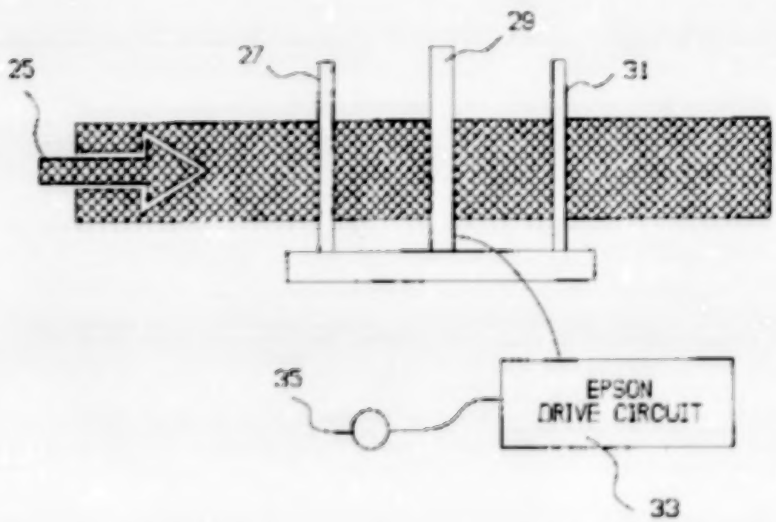
Colin, Soutar, Inventor, NASA Johnson Space Center, USA; Juday, Richard D., Inventor, NASA Johnson Space Center, USA; Jan. 12, 1999; 28p; In English

Patent Info.: Filed 24 Oct. 1994; NASA-Case-MSC-22378-2; US-Patent-5,859,728; US-Patent-Appl-SN-327762; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A method and apparatus for modulating a light beam in an optical processing system is described. Preferably, an electrically-controlled polarizer unit and/or an analyzer unit are utilized in combination with a spatial light modulator and a controller. Preferably, the spatial light modulator comprises a pixelated birefringent medium such as a liquid crystal video display. The combination of the electrically controlled polarizer unit and analyzer unit make it simple and fast to reconfigure the modulation described by the Jones matrix of the spatial light modulator. A particular optical processing objective is provided to the controller. The controller performs calculations and supplies control signals to the polarizer unit, the analyzer unit, and the spatial light modulator in order to obtain die optical processing objective.

Official Gazette of the U.S. Patent and Trademark Office

Liquid Crystals; Light Modulation; Light Beams; Polarizers; Light Modulators



19990046782 NASA Stennis Space Center, Bay Saint Louis, MS USA

Multi Spectral Imaging System

Spiering, Bruce A., Inventor, NASA Stennis Space Center, USA; May 04, 1999; In English

Patent Info.: Filed 26 Sep. 1997; NASA-Case-SSC-00048; US-Patent-5,900,942; US-Patent-Appl-SN-938300; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

An optical imaging system provides automatic co-registration of a plurality of multi spectral images of an object which are generated by a plurality of video cameras or other optical detectors. The imaging system includes a modular assembly of beam splitters, lens tubes, camera lenses and wavelength selective filters which facilitate easy reconfiguration and adjustment of the system for various applications. A primary lens assembly generates a real image of an object to be imaged on a reticle which is positioned at a fixed length from a beam splitter assembly. The beam splitter assembly separates a collimated image beam received from the reticle into multiple image beams, each of which is projected onto a corresponding one of a plurality of video cameras.

The lens tubes which connect the beam splitter assembly to the cameras are adjustable in length to provide automatic co-registration of the images generated by each camera.

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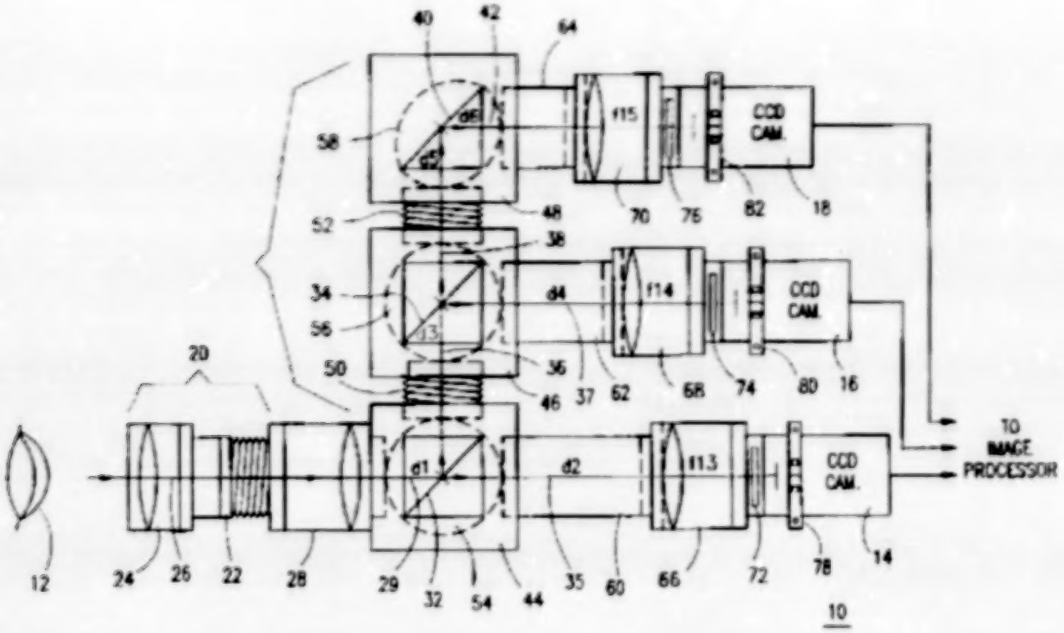
Imaging Techniques; Optical Measuring Instruments; Cameras



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The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, DC 20546 Telephone: (202) 358-2066
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PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINITRATION
14 CFR Part 1245
Patents and Other Intellectual Property Rights

AGENCY: National Aeronautics and Space Administration (NASA).

Action: Final rule.

SUMMARY: NASA is amending 14 CFR Part 1245 by removing Subpart 2, "Licensing of NASA Inventions." The Department of Commerce has issued similar regulations which prescribe the terms, conditions, and procedures upon which a federally-owned invention may be licensed. These regulations are codified at 37 CFR Part 404, "*Licensing of Government Owned Inventions.*" NASA began granting licenses in accordance with the Department of Commerce regulations on March 13, 1995. All licenses agreements executed prior to this date will operate under the previous regulations.

EFFECTIVE DATE: March 13, 1995.

FOR FURTHER INFORMATION CONTACT:
John G. Mannix, (202) 358–2424.

List of Subjects in 14 CFR Part 1245

Authority delegations (Government agencies), Inventions and patents.

Under the authority, 42 U.S.C. 2473, 14 CFR Part 1245 is amended as follows:

PART 1245 — [AMENDED]

Subpart 2 — [Removed and Reserved]

In 14 CFR Part 1245, Subpart 2 (consisting of SS 1245.200 through 1245.214) is removed and reserved.

Dated: April 24,1995.

Edward A. Frankle.
General Counsel.

[FR Doc. 95 10583 Filed 4–28–95, 8:45 am]

BILLING CODE 7510 01 M

Code of Federal Regulations 37
CFR Part 404
Licensing of Government Owned Inventions

Sec.

404.1 **Scope of part.**
404.2 **Policy and objective.**
404.3 **Definitions.**
404.4 **Authority to grant licenses.**
404.5 **Restrictions and conditions on all licenses granted under this part.**
404.6 **Nonexclusive licenses.**
404.7 **Exclusive and partially exclusive licenses.**
404.8 **Application for a license.**
404.9 **Notice to Attorney General.**
404.10 **Modification and termination of licenses.**
404.11 **Appeals.**
404.12 **Protection and administration of invetions.**
404.13 **Transfer of custody.**
404.14 **Confidentiality of information.**

Sec. 404.1 Scope of part.

This part prescribes the terms, conditions, and procedures upon which a federally owned invention, other than an invention in the custody of the Tennessee Valley Authority, may be licensed. It supersedes the regulations at 41 CFR Subpart 101–4.1. This part does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

Sec. 404.2 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from federally supported research or development.

Sec. 404.3 Definitions.

(a) "*Federally owned invention*" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "*Federal agency*" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a federally owned invention.

(c) "*Small business firm*" means a small business concern as defined in section 2 of Pub. L. 85–536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration.

(d) "*Practical application*" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(e) "*United States*" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

Sec. 404.4 Authority to grant licenses.

Federally owned inventions shall be made available for licensing as deemed appropriate in the public interest. Federal agencies having custody of federally owned inventions may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this part.

Sec. 404.5 Restrictions and conditions on all licenses granted under this part.

(a) (1) A license may be granted only if the applicant has supplied the Federal agency with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a federally owned invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) Licenses shall contain such terms and conditions as the Federal agency determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this part. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement unless sooner terminated in accordance with this part.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of the Federal agency, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The licensee may provide the license the right to grant sublicenses under the license, subject to the approval of the Federal agency. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to the Federal agency.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) Licenses may be royalty-free or for royalties or other consid-eration.

(8) Where an agreement is obtained pursuant to Sec.404.5(a) (2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of the Federal agency to terminate the license, in whole or in part, if:

(i) The Federal agency determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of the Federal agency that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) The Federal agency determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this part, upon mutual agreement of the Federal agency and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this part shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Sec. 404.6 Nonexclusive licenses.

(a) Nonexclusive licenses may be granted under federally owned inventions without publication of availability or notice of a prospective license.

(b) In addition to the provisions of Sec. 404.5, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, the Federal agency may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

Sec. 404.7 Exclusive and partially exclusive licenses.

(a) (1) Exclusive or partially exclusive domestic licenses may be granted on federally owned inventions three months after notice of the invention's availability has been announced in the Federal Register, or without such notice where the Federal agency determines that expeditious granting of such a license will best serve the interest of the Federal Government and the public; and in either situation, only if:

(i) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period;

(ii) After expiration of the period in Sec. 404.7(a)(1)(i) and consideration of any written objections received during the period, the Federal agency has determined that:

(A) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(B) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(D) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(iv) The Federal agency has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) In addition to the provisions of Sec. 404.5, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to the Federal agency the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) (1) Exclusive or partially exclusive licenses may be granted on a federally owned invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) The agency has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii)The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) In addition to the provisions of Sec. 404.5 the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii)The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) Federal agencies shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Sec. 404.8 Application for a license.

An application for a license should be addressed to the Federal agency having custody of the invention and shall normally include:

(a) Identification of the invention for which the license is desired including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of the representative of the applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether the applicant is a small business firm as defined in Sec.404.3(c)

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

Sec. 404.9 Notice to Attorney General.

A copy of the notice provided for in Sec. 404.7(a)(1)(i) and (b)(1)(i) will be sent to the Attorney General.

Sec. 404.10 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, the Federal agency shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license shall not be modified or terminated.

Sec. 404.11 Appeals.

In accordance with procedures prescribed by the Federal agency, the following parties may appeal to the agency head or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(a) A person whose application for a license has been denied.

(b) A licensee whose license has been modified or terminated, in whole or in part, or

(c) A person who timely filed a written objection in response to the notice required by Sec. 404.7(a)(1)(i) or Sec. 404.7(b)(1)(i) and who can demonstrate to the satisfaction of the Federal agency that such person may be damaged by the agency action.

Sec. 404.12 Protection and administration of inventions.

A Federal agency may take any suitable and necessary steps to protect and administer rights to federally owner inventions, either directly or through contract.

Sec. 404.13 Transfer of custody.

A Federal agency having custody of a federally owned invention may transfer custody and administration, in whole or in part, to another Federal agency, of the right, title, or interest in such invention.

Sec. 404.14 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to Sec. 404.8 (h) and any report required by Sec. 404.5(b)(6) may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

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